DOCUMENT RESUME

ED 039 002 LI 001 929

AUTHOR	Surace, Cecily J.
TITLE	The Displays of a Thesaurus.
INSTITUTION	Rand Corp., Santa Monica, Calif.
REPORT NO	P-4331
PUB DATE	Mar 70
NOTE	38p.
EDRS PRICE	EDRS Price MF-$0.25 HC-$2.00
DESCRIPTORS	*Computer Programs, *Indexes (Locaters), *Indexing, *Information Retrieval, Lexicography, *Thesauri
IDENTIFIERS	*On Line Systems

ABSTRACT

What is the desirability and usefulness of different thesaurus displays used either singly or in groups? Is an alphabetical listing of terms with cross references more useful to an indexer than a complete hierarchical display? Is the permuted or the rotated term index more useful to the indexer or retriever? Is an alphabetical display along with a permuted display of more use than an alphabetical display and hierarchical display? These are some of the questions raised and, at least, partially answered. The thesaurus display techniques described include the kinds for: (1) hierarchy, (2) categorization, (3) permutation and (4) semantic and syntactic relationships. Some intuitive discussion is given on displays which appear to be of more utility to the indexer or the retriever. However, no actual tests of indexers using the same thesaurus in different displays, or studies of how indexers might supplement one display with another were attempted. There is a brief discussion of the impact of the computer especially the assistance the computer offers to file update and maintenance and the impact of on-line terminals for display. (NH)

ED039002

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

THE DISPLAYS OF A THESAURUS

Cecily J. Surace

March 1970

LI 001929

P-4331

JUN 1 197

ED039002

THE DISPLAYS OF A THESAURUS

Cecily J. Surace*

The Rand Corporation, Santa Monica, California

A great deal of literature exists on the development or construction of a subject authority file or thesaurus, including the importance of vocabulary control techniques. Very little exists in the literature however, on the best way to display the authority file or thesaurus for efficient and consistent use by the indexer and the retriever. Even less information is available on the desirability and usefulness of different displays either singly or in groups. For example, is an alphabetical listing of terms with cross references more useful to an indexer than a complete hierarchical display? What value does the permuted or rotated term index serve? Is it more useful to the indexer or retriever? To the experienced or inexperienced indexer? Is an alphabetical display along with a permuted display of greater utility than an alphabetical display and a hierarchical display? Questions of this nature are very relevant to a system designer concerned with the construction or automation of a thesaurus where cost is a great factor. It is estimated that a thesaurus maintenance program will cost between $50,000 - $75,000 to design and code; some programs are available for sale at $15,000. Considering these costs, it is difficult to understand why thesauri continue to be developed and constructed with so little recorded study of alternative displays. It is also difficult to understand why studies on indexing consistency and effectiveness have not concerned themselves with studying the effect different displays

---

*Any views expressed in this paper are those of the author. They should not be interpreted as reflecting the views of The Rand Corporation or the official opinion or policy of any of its governmental or private research sponsors. Papers are reproduced by The Rand Corporation as a courtesy to members of its staff.

of a thesaurus may have on the indexer. Instead these studies generally concern themselves with comparisons of different kinds of authority files, assuming the organizations using these files have the same objectives, or else concern themselves with indexer consistency in terms of experience vs non-experience.

This paper will attempt to describe several display techniques for a thesaurus, including the kinds of displays for hierarchy, categorization, permutation, and semantic and syntactic relationships. Where possible some intuitive discussion will be included on displays which appear to be of more utility to the indexer or the retriever. No attempt was made to perform actual tests of indexers using the same thesaurus in different displays, nor was there time to determine how indexers might supplement one display with another.[1] Instead, this paper may be categorized as one which raises some questions but which is not successful in answering them, or else only partially successful.

Included also in this paper will be a brief discussion of the impact of the computer especially in terms of the assistance the computer offers to file update and maintenance, and the impact of on-line terminals for display.

Thesaurus Definitions

Many definitions exist for a thesaurus:

> "A thesaurus is an authority file which can lead the user from one concept to another via various heuristic or intuitive paths. It may be manually operated or mechanized for assignment of index headings."
>
> P. W. Howerton (in Newman, 1965)

> "An authority file ... consists of a standardized, controlled vocabulary, with cross-references between the terms of the vocabulary and cross-references to terms of the vocabulary... It consists of either a controlled vocabulary or a set of cross-references, or both."
>
> P. Reisner (in Newman, 1965)

---

[1] Only one paper was found in the literature which concerned itself with the use indexers made of different displays of a thesaurus. This was a paper by Rainey (1970) which surveyed 75 special libraries to determine how they used the NASA and EJC/DOD thesauri, and which included a question on whether indexers used the special indexes.

"A thesaurus is a device for controlling and displaying an indexing vocabulary."

T. L. Gillum (1964)

"An organized reference of the terms accepted and approved as a standard by participating members of a specialized population in a defined area of information, which identifies the scope of each term by inclusions, exclusions and associations, so that all terms are clear and discrete and in the aggregate are comprehensive for communication and identification of information in the defined area."

P. C. Daniels (1969)

In summary, another definition is offered: A thesaurus is a list of authorized terms or descriptors which serve to standardize and delimit concepts found in publications, and which when structured and displayed reveal relationships of a semantic, syntactic or hierarchical nature.

The type of thesaurus of primary interest to this paper is best represented by the EJC-DOD thesaurus.

Eugene Wall (1969) suggests that there are four basic principles for a thesaurus: the use of natural language; an environment which permits the addition of new terminology; cross references including semantic and hierarchical viewpoints; and what he refers to as "form and format," further defined as "ease of use." There is no indication that the thesaurus should be displayed in more than one form or format although Mr. Wall has certainly contributed significantly to the various ways a thesaurus can be displayed. In fact, most discussions of thesaurus displays are really discussions of the techniques used to reveal the semantic, syntactic and hierarchical structure of cross references embodied in an alphabetical list of terms. Indeed the application of these control techniques results in a display, but this is perhaps more an effect or result of the techniques, rather than the starting point of the thesaurus construction. Or is this the chicken and egg syndrome? Perhaps this is because today's thesaurus builders are operating in a coordinate indexing environment and are not concerned with more fundamental issues of the form of headings or their display.

Since natural language is used and in most cases single words (although some pre-coordinated terms are used) the philosophical discussions of direct headings vs indirect headings or classification are almost non-existent. However, is this really so? Or are today's thesauri with their increased use of auxiliary displays to reveal hierarchical schemes, category listings, and permuted listings intended to provide the best of all worlds never resolved by the battles which raged in the above mentioned philosophical discussions? While the economics of building alternative displays for manually controlled thesauri have conditioned us to accept a single display, and that the alphabetical term display, the computer-managed or automated thesaurus on the other hand, has made alternative displays economically feasible, and as a result offers an opportunity to the thesaurus designer to consider new formats. It is suggested that more study and analysis of alternative displays is essential for a more complete understanding of the role the thesaurus plays in indexing and retrieval operations. It is also recognized that no discussion of thesaurus displays can avoid discussion of control techniques.

Control Techniques

Included in control techniques are term selection, the use of abbreviations and acronyms, use of nouns or other forms, singular vs plural, and alphabetization. Additional control techniques include cross references for semantemes: synonyms, homographs, antonyms, generics, part-whole, related terms, and scope notes and parenthetical expressions to avoid ambiguity.

Alphabetical Display

The alphabetical display or thesaurus terms is the most common form of display, influenced historically by the conventional alphabetical display of indexes and subject heading authority files. In its simplest form the alphabetical display or dictionary display consists of a list of terms or

descriptors in natural language order without cross references. Obviously this display is very limited and offers little assistance to the indexer or retriever, unless the list of terms is very small and a quick glance reveals all the terms. No network or cross references are present to help the user weave his way to a more specific or more generic level, etc. Coates (1960) refers to this display as the alphabetico-specific subject catalogue. In its most common form it does include "see" and "see also" cross references, and attempts to provide through these conventions control over synonyms, class and related terms thereby offering some classification scheme.

Most modern day thesauri are not limited to a simple alphabetical display of terms, but rather incorporate the more complex cross reference scheme found in the more sophisticated alphabetico-specific subject authority files. The notation used may be different however. Instead of "See" and "See also" with X and XX as reciprocals, the notation in current vogue is "See" and "Used for," and "RT" representing related term. "RT" is also used as a reciprocal to "RT." And of course some hierarchy is included in the use of "NT" (narrower term) and "BT" (broader term) notations.

The thesaurus or subject heading authority file which limits itself to the alphabetico-specific display does not provide the user with a complete generic structure however. The classification scheme built into the thesaurus by use of "See" and "RT" cross references is rather limited and the user may have to refer to several terms before arriving at the desired term or terms. This is a gross over-simplication of the problems associated with the alphabetico-specific display. The reader is referred to Coates (1960) and others for more complete discussions.

An alternative approach to resolve the dictionary display problems is the use of an alphabetico-classed display. This authority file is based on an alphabetical display of terms with the use of subdivisions to reveal generic relationships. For example:

Aircraft		Aircraft
Bombers		Aircraft - Bombers
Fighters	or	Aircraft - Fighters
Supersonic		Aircraft - Supersonic
Transport		Aircraft - Transport

instead of: Aircraft see also Bombers, Fighters, etc.

This form of display is helpful to the indexer because it reveals at a glance the related terms. However, the indexer or retriever may not know which is the main class term - Aircraft, or Fighter Aircraft, or Commercial Aircraft, etc. Thus "see" references are required throughout the classed display, increasing the size of the file. An alternative is to provide a second display which is an alphabetical index to the classed file indicating the main or class terms. However this results in a two-step operation and double file maintenance.

The alphabetico-classed file also raises the issue of what constitutes a main or class term, and what is subsumed under it, and how specific the subsumed terms should be. In addition, a term can belong to more than one class.

The modern day thesaurus generally does not attempt to provide a classed thesaurus as the main display. Instead a partial hierarchical display is interwoven in the cross references of the main alphabetical display, and separate hierarchical and category or class displays are provided as auxiliary tools.

Another approach to provide an organic structure to the authority file is the use of inverted headings. This form of display is based on the premise that in multiword subject headings there is one term that is more important, and this is the term the indexer and retriever will use. Also in selecting these "key" words, and listing terms by their key word, a natural class structure is provided. Thus for example:

Airplanes
Airplanes, Commercial
Airplanes, Fighter
Airplanes, Transport

Where necessary, cross references are provided from the natural language text to the inverted entry.

Although inverted headings are not used in very many modern day thesauri, it is fairly safe to conclude that the complex cross reference structures prevalent today are an attempt to reveal some of the relationships that the inverted headings accomplished. But, is it as safe to conjecture that the permuted or rotated display of thesaurus terms is an attempt to recall the inverted heading structure? Today's thesaurus designer prefers natural language text in alphabetical order, and for good reasons. Yet he also builds category or classed displays, hierarchical, and permuted displays as auxiliary tools. Can this be because the computer is there and easily provides these additional displays? Is it because programmers enjoy the additional coding? Or is it because the designer recognizes, as have librarians who designed the earlier "conventional" systems, that the development and design of a thesaurus is a very complex problem and requires more than a single solution?

In summary, it can be said the more conventional subject authority files dispersed related concepts although each claimed to overcome this problem through the use of cross references, and they tended to use one-way generic cross references, from the generic to the specific, and not the reverse. Again, this is a very superficial review of conventional subject authority files which does not even mention faceted and chain indexing. The reader is referred to the literature for a complete review.

Thesaurus Display

It has been said that coordinate indexing changed the future for the subject indexer and the index designer. With the concept of coordinate indexing and its development and evolution, the modern day thesaurus was born. The reader is referred to the literature for background on coordinate indexing. A useful starting point is Jaster et al., (1962) in which a 45 page bibliography may be found. No attempt will be made either to show

how the thesaurus developed and gradually adopted the concepts of the more conventional authority files. This information is included in the literature on coordinate indexing and vocabulary control.

Today's thesaurus may be an alphabetical display of terms with cross references revealing semantic, syntactic and hierarchical structures, or it may consist of individual alphabetical, hierarchical, permuted, and category or class displays, where the hierarchical and other displays are automatically generated from the main alphabetical display. It may also include information on the number of postings for each term, and may be tied to an on-line system which provides the indexer an opportunity to see what other documents have been indexed under specific terms. Certainly this is a more sophisticated tool than the manual systems could provide. But it is not necessarily a "new" concept to be attributed to the developers of coordinate indexing. Except for including the number of postings for each index term or descriptor in the thesaurus, there are no new concepts that were not known and practiced in the earlier "conventional" systems.[1] Indeed the indexer often referred to the card catalog to see what had been indexed previously under a given term. Until book catalogs were computer produced or on-line systems were designed, the indexer using a coordinate index system had a more circuitous path to follow if he wanted to know what had been indexed under a particular term. It is true however, that the earlier systems did not provide for multiple display of their subject authority files. This had to wait for the computer to make it economically feasible, not necessarily coordinate indexing.

Main Body Display

The alphabetical display[2] of thesaurus terms is the most common form of display. it generally incorporates the following conventions:

---

[1] The author is not concerned here with the indexing philosophy of coordinate indexing, only with the display of words in a thesaurus or authority file.

[2] See Figures 1-7 for samples of alphabetical displays.

Main Term - This is an accepted index term. Associated with it will be the notations: UF, NT, BT, RT.

UF = Used For - Main terms are often used for or in place of less desirable or unacceptable synonyms or near synonyms.

See = A synonym or unacceptable term will be entered in the thesaurus, but will refer to the acceptable term.

NT = Narrower term. This is part of the hierarchical notation referring to a more specific term.

BT = Broader term. This is part of the hierarchical notation referring to a more generic term.

RT = Related term. An RT is considered to have close association or relationship to a main term, but is not in the same class as the main term.

Additional control techniques include the use of scope notes and parenthetical expressions to reduce ambiguity and avoid semantic problems.

The use of these control techniques or conventions is intended to serve as a guide to the thesaurus user (indexer or retriever) in the correct selection of terms at the required level of specificity.

At least two approaches are possible in the display of the generic structure internal to the alphabetical display. The designer may elect to include all NT's and BT's associated with a term, or reveal only one level of generic structure -- one BT up and one NT down.

As the example shows (see following page), the generic display provides more immediate information to the thesaurus user, and obviously saves time in the selection of the appropriate terms. The single level structure requires the user to refer to several main terms before the appropriate level of specificity is determined. Certainly the more complete generic structure is desirable from the point of view of the indexer or

Single Level Display

ABS RESINS
  BT Acrylate copolymers

ACRYLATE COPOLYMERS
  BT Acrylic copolymers
  NT ABS resins

ACRYLIC COPOLYMERS
  BT Acrylic resins
  NT Acrylate copolymers

ACRYLIC RESINS
  BT Addition resins
  NT Acrylic copolymers

ADDITION RESINS
  NT Acrylic resins

Generic Structure Display

ABS RESINS
  BT Acrylate copolymers
     Acrylic copolymers
     Acrylic resins
     Addition resins

ACRYLATE COPOLYMERS
  BT Acrylic copolymers
     Acrylic resins
     Addition resins
  NT ABS resins

ACRYLIC COPOLYMERS
  BT Acrylic resins
     Addition resins
  NT ABS resins
     Acrylate copolymers

ACRYLIC RESINS
  BT Addition resins
  NT ABS resins
     Acrylate copolymers
     Acrylic copolymers

ADDITION RESINS
  NT ABS resins
     Acrylate copolymers
     Acrylic copolymers
     Acrylic resins

retriever. A possible disadvantage is the increase in size of the thesaurus. Eugene Wall (private correspondence) implies that this "disadvantage" may increase line entries by about 10 percent. However this may be a small penalty, if any, compared to the disadvantage of tracing the structure of the single level display.

A more serious disadvantage of the sophisticated display is that it does not reveal a true hierarchy because it does not distinguish between the levels of specificity of the BT's and NT's. For instance, under Acrylic copolymers, which is the broader or more generic of the two terms Acrylic resins and Addition resins? The same type of question applies to the NT's. Perhaps a specialist in resin technology would have no difficulty with this structure. However, not all indexers, and certainly not all retrievers are experts in resin technology.

In retrieval systems where up-posting is automatically generated and a hierarchical search capability exists, it is critical that the retriever know the hierarchy, or else he may select terms which are inappropriate for his search strategy and which will either inundate him with excessive and/or irrelevant documents, or which will deny him the full display of documents available in the file on his subject. Of course if the indexer is unfamiliar with the hierarchy, and it is not explicitly displayed, he may index the documents at a level which is either too broad or too specific.

Hierarchical Display

In order to overcome this serious disadvantage two options are possible. Either incorporate a strict hierarchical display into the main thesaurus, or produce an auxiliary display -- a hierarchical index. Most thesauri designers have opted for the latter approach, probably because the main alphabetical display with a complete hierarchy would require far more sophisticated programming, and would increase the bulk of the display. Hammond (1967) states to "employ the hierarchical display format throughout

the main body of ... the DOD thesaurus the four-column format would have to have been reduced to three and would have added a hundred pages to the printed book." What is not considered here is the time to be saved by the indexer and the retriever if only one look-up is required.

The hierarchical display as an auxiliary, provides the thesaurus user with a format which clearly outlines the levels of specificity. Thus the examples discussed above, might look like this in the display:

ADDITION RESINS
  Acrylic resins
    Acrylic copolymers
      Acrylate copolymers
        ABS resins

There certainly is no ambiguity here whether Addition resins is broader or more generic to Acrylic resins. The indentations tell the story. This form of display, as mentioned above, does require the user to search in two files -- the main alphabetical and the hierarchical files -- to determine the structure. Of course if the user knew in advance the main term (in this instance Addition resins) he would refer to the hierarchical display immediately.

Some hierarchical displays are designed (EJC-DOD, and NASA) to list as main hierarchical terms only those terms having no BT's and at least two generic levels listed in the main body. Thus the index or display is not a complete display of all possible hierarchies in the thesaurus. (See Figs. 8-9a).

An obvious advantage of the hierarchical display is that it reveals all levels of specificity at each main term subsumed under a class term (has no BT). This does however, raise the shadow of earlier discussions on hierarchical or classed authority files. What really constitutes a class term? Certainly not an artificial convention such as: No BT. And on what basis is a term subsumed under one class and not another? Can a term belong to more than one class? Perhaps the answer to these questions

is to be found in the following quotations from the Information Retrieval Thesaurus of Education Terms: "Our major consideration in constructing a BT-NT hierarchy has been that hierarchy's potential usefulness in indexing and searching. Whether or not the hierarchy effectively mirrors some definite 'objective' reality has not always been of crucial practical importance."

Permuted Display

Gillum (in Daniels, et al., 1969) states that the permuted or rotated index is "essentially a computer sort or KWIC index of the words in the vocabulary ... Since each word in each term is an entry point, all terms having (significant) words in common file together and provide a collection point for terms that are separated because of the use of direct entries."

Thesauri that use natural language, may exhibit a rotated index to serve the same purpose as an inverted file. (See Figs. 10-11). Obviously it is useful only when a thesaurus utilizes multi-word or pre-coordinated terms. If uniterms in their strictest sense comprise the thesaurus, there would be no need for permutations.

The permuted index (inverted file) is probably of more use to the uninitiated or inexperienced indexer (Wall, private correspondence) and retriever, although there is no discussion of the utility of this auxiliary display. Can it be the thesaurus designer is hedging his bets and wants to cover all aspects of building an authority file because the computer is there?

Category Index

Another form of display for a thesaurus is the category display which is intended to divide or segment the thesaurus' terms into broad subject or class areas less rigid than the hierarchical display. The categories, which can be based on discipline, on taxonomy, etc., bring together terms that belong to a group, but which normally are interspersed throughout the

alphabetical display. It appears the groups can be, and indeed are, arbitrarily selected. One basic requirement is that they be mutually exclusive although this in fact may be difficult to achieve since some terms will fall into more than one group. The EJC-DOD thesaurus for example, utilizes the COSATI Subject Category Index as the basis for its category display. (See Figs. 12-13).

Gillum (in Daniels, et al., 1969) states that the subject category "displays are believed to be reasonably coherent and of useful content, but the real utility of this display has not been determined." He does suggest however, that it would contribute to the indexing and retrieval operations "when it is necessary to determine generally the scope of depth of vocabulary development in some subject area." Since this display is intended to bring together terms that represent a logical grouping it is conceivable the individual groups would contribute to the development of microthesauri, but it is difficult to determine to what extent. Tancredi and Nichols (1968) describe how they developed the Microthesaurus of Air Pollution Terms by establishing broad categories for the terms and then extending them to more specific subcategories. (Refer to Fig. 14). They also display a hierarchical treatment of the terms within the categories which invites the thought that perhaps the hierarchical display should also be considered as useful in the development of a microthesaurus.

It may be the only certain use of the subject category display is in developing a means for assigning terms to categories which reflect the categories used in an announcement bulletin. This serves as a useful guide to the listing of new documents in the bulletin, based on the index terms assigned to the documents, and the categories the terms represent in the category display. The DDC Technical Abstract Bulletin and NASA STAR are examples of this usage.

In summary it appears this display assists the indexer or retriever the least. If the indexer was responsible for assigning documents to specific

categories for announcement in a bulletin, its utility would be increased, but this is done by the computer program.

Role of the Computer

The introduction of the computer to the construction and maintenance of the thesaurus has significantly altered the display of the thesaurus and greatly reduced the human editing and maintenance operations. As was mentioned earlier, the automated thesaurus can be programmed to generate reciprocals, check for completeness of cross references and their consistency. More sophisticated programs can provide for hierarchical completeness and consistency. Editing of spelling, term acceptability, term length, etc. is an easy capability of these programs, as well as file update and maintenance. Some programs also include automatic up-posting capability.

While the state of the art indicates it is relatively simple to design and code a program to automatically generate and check reciprocals for a single level hierarchical structure, it is quite another ball game to design a program to generate reciprocals for a full hierarchical display. It has been estimated (and experienced) that this type of program costs upwards of $50,000! Thus the economic considerations greatly influence the design and completeness of the thesaurus. However, economic considerations must also include cost-benefit considerations. A complete hierarchical display with automatic generation of reciprocals and editing capability is great, but is the cost of designing and coding this program offset by greater indexing and retrieval effectiveness? For instance what is the cost-benefit of all the auxiliary displays discussed above? How are they used and how often, by indexers and retrievers? Are they all required? Or have we fallen into the old trap of manipulating data and producing additional reports as a gimmick to justify computer costs? It would seem an automated thesaurus can reduce indexing and retrieval time, and greatly reduce human editing and file maintenance. Certainly an automated thesaurus should be a subsystem of an automated retrieval system. What the author doesn't

know is how sophisticated should that thesaurus be? It has been said that an information retrieval system is successful in proportion to the success or effectiveness of its thesaurus and the indexing operation. But at what cost?

The computer has also contributed to the development of the thesaurus by providing the capability of counting the frequency of use of terms thereby offering the opportunity to introduce more specific, or broader terms as required. It is true in the conventional systems the card catalog served the same purpose. An indexer could decide it was time to break down a term because of the number of cards filed under it. But the maintenance problem was prohibitive and most indexers tended to avoid noticing the file size. In an automated environment however, correction of posting is relatively simple and encourages file maintenance.

Claire Schultz, et al. (1961) refer to the "combining power" of terms. If an indexer or retriever knows the number of times an index term has been used, it reveals something about the "combining power" of the term. The authors conclude that "... individual descriptors have the ability to combine with other descriptors in proportion to the frequency with which they are used singly. An infrequently used descriptor has little combining power; a frequently used descriptor has high combining power." By associating the thesaurus file with the frequency of postings, the computer provides the indexer with a powerful tool to adjust index terminology. Terms with weak combining power can be eliminated or included in broader terms; terms that have excessive combining power (over-posted) can be made more specific. Thus the thesaurus becomes a more dynamic authority file.

It was mentioned earlier that the card catalog served as a guide to the indexer revealing which documents had been indexed under certain terms. Coordinate index systems made this a more difficult operation. However, the computer has again contributed to this area with the introduction of on-line systems. In such an environment the indexer can search the thesaurus files, note the number of postings under the coordinate terms and

also ask for an on-line display of some of the document references already indexed under the terms, and note the additional terms used to index these documents. (The card catalog revisited?) This form of display can assist in increasing correct usage of terms and contribute to indexer consistency. And of course the benefits to the retriever are equally useful. Such a system is described by Bennett (1969). The reader is also referred to the Lockheed Dialog system and the NASA Recon system.

A further extension of the use of on-line systems in an indexing environment appeared in the literature recently, but the reference has been lost. Essentially, the indexer refers to an automated on-line card catalog and attempts to determine if the bibliographic references or citations in the article to be indexed, are already entered into the card catalog. If any of the citations are there, the indexer next asks to see the index terms assigned to these citations, thereby gaining some clues as to which terms may be likely candidates for indexing the article in hand. This method is an extended citation indexing approach which reveals the superior power of an on-line system for improving indexing consistency and effectiveness.

Although this discussion of the impact of the computer is brief, it should not be interpreted as a snub. The computer has dramatically altered the field of information analysis, storage and retrieval, and has broadened the horizons of librarians and documentalists. Without it information retrieval would still be in the dark ages.

REFERENCES

Bennett, J. L. On-line access to information: NSF as an aid to the indexer/cataloger. American Documentation, July 1969, pp. 213-220.

Coates, E. J. Subject catalogues: headings and structure. London, The Library Association, 1960, 186 p.

Daniels, P. C., et al. The thesaurus in action. Background information for a thesaurus workshop at the Annual Convention of the American Society for Information Science (32nd), October 1969, San Francisco, California. October 1969, 39 p.

Gillum, T. L. Compiling a technical thesaurus. Journal of Chemical Documentation, January 1964, pp. 29-32.

Newman, S. M. Information systems compatibility. Spartan, 1965.

Rainey, L. Experiences with the new TEST Thesaurus and the new NASA Thesaurus. Special Libraries, Vol. 61, January 1970, pp. 26-32.

Schultz, C. K., et al. A comparison of dictionary use within two information retrieval systems. American Documentation, October 1961, pp. 247-253.

Tancredi, S. A. and Nichols, O. D. Air pollution technical information processing -- the microthesaurus approach. American Documentation, January 1968, pp. 66-70.

Wall, E. Personal correspondence. 24 November 1969.

Wall, E. Vocabulary building and control techniques. American Documentation, Vol. 20, April 1969, pp. 161-164.

ADDITIONAL REFERENCES

American Institute of Chemical Engineers. Chemical engineering thesaurus. 1961.

American Petroleum Institute. Subject authority list. 1966.

Blagden, J. F. Thesaurus compilation methods: a literature review. ASLIB Proc., Vol. 20, August 1968, pp. 345-359.

Cain, A. M. Thesaural problems in an on-line system. Bull. Med. Libr. Assn., Vol. 57, July 1969, pp. 250-259.

Castner, W. G., et al. The MECCA vocabulary control system for library collections. The Boeing Co., 1968, 21 p.

COSATI. Guidelines for the development of information retrieval thesauri. 1967. 9 p.

EJC/DOD. Thesaurus of engineering and scientific terms. December 1967.

Eller, J. L. and Panek, R. L. Thesaurus development for a decentralized information network. American Documentation, July 1968, pp. 213-220.

FAA thesaurus of technical descriptors, 1969.

Fried, C. and Prevel, J. J. Effects of indexing aids on indexing performance. General Electric Co., October 1966, 192 p. RADC-TR-66-525.

General Electric. Apollo Support Department. Thesaurus development and guides for indexing and search functions. April 1963.

Grosch, A. N. Thesaurus construction. Special Libraries, Vol. 60, February 1969, pp. 87-92.

Gull, C. D. Structure of indexing authority lists. Library Resources and Technical Services, Vol. 10, No. 4, Fall 1966, pp. 507-512.

Hohnecker, W. and Newmark, M. Automated maintenance of a highly structured thesaurus at Engineering Index. N.Y., American Documentation Institute Proceedings, 1967.

Holm, B. E. and Rasmussen, L. E. Development of a technical thesaurus. American Documentation, Vol. 12, July 1961, pp. 184-190.

Information retrieval thesaurus of education terms. Cleveland, Ohio, The Press of Case Western Reserve University, 1968.

Joyce, T. and Needham, R. M. The thesaurus approach to information retrieval. American Documentation, Vol. 9, No. 3, 1958, pp. 192-197.

Korotkin, A. L., et al. Indexing aids, procedures and devices. General Electric Co., April 1965, 106 p. RADC-TR-64-582.

Lynch, M. F. Computer-aided production of printed alphabetical subject indexes. Documentation, September 1969, pp. 244-252.

McClelland, R.M.A. and Mapleson, W. W. Construction and usage of classified schedules and generic features in co-ordinate indexing. Aslib Proceedings, October 1966, pp. 290-299.

NASA Thesaurus. 3 vols. December 1967.

National Agricultural Library. Agricultural/biological vocabulary. 1967.

Naval Ordnance Lab. Descriptors and computer codes used in Naval Ordnance Laboratory library retrieval program. October 1964.

The New York Times thesaurus of descriptors. 1968.

New York University. Urbandoc thesaurus. May 1967.

North American Rockwell information processing system thesaurus. August 1969.

Oak Ridge National Laboratory. NSIC keyword thesaurus. August 1967.

Office of Naval Research. Project Lex. DOD Manual for building a technical thesaurus. April 1966, 24 p. ONR-25.

Rolling, L. The role of graphic display of concept relationships in indexing and retrieval vocabularies including a thesaurus of documentation terms. EAEC-EURATOM, 1965.

Rostron, R. M. The construction of a thesaurus. Aslib Proceedings, Vol. 20, March 1968, pp. 181-187.

Scheffler, F. L. and Smith, R. B. Document retrieval system operations including the use of microfiche and the formulation of a computer aided indexing concept. February 1969. AFML-TR-68-367.

Schirmer, R. F. Thesaurus analysis for updating. Journal of Chemical Documentation, Vol. 7, May 1967, pp. 94-98.

Shumway, N. Medlars: vocabulary construction and medical subject headings. Nolte Center for Continuing Education.

Slamecka, V. Indexing aids. January 1963. RADC-TDR-62-579.

Thesaurus of engineering terms. 1964.

Thesaurus of ERIC descriptors. 1967.

Thesaurus of information science terminology. 1968.

Vaswani, P.K.T. Mechanized storage and retrieval of information. Rev. Int. Doc. Vol. 32, No. 1, 1965, pp. 19-22.

Acyl halides 0703
BT Acid halides
NT Acetyl chloride
Acyltransferases 0601
BT Enzymes
Transferases
Adamellite
USE Quartz monzonite
Adaptability
USE Adaptation
Adaptation 1407
UF Adaptability
NT Acclimatization
Adjustment (psychology)
Dark adaptation
RT—Acuity
Compensation
Correction
—Fitting
—Hibernation
Homeostasis
Reaction time
—Sensitivity
Thresholds (perception)
Adapters 1305
RT Casing tools
Extensions
—Fittings
Sleeves
Adaptive communication 1702
BT Telecommunication
Adaptive control
USE Adaptive systems
and Automatic control
Adaptive electric filters
USE Adaptive systems
and Electric filters
Adaptive optical filters
USE Adaptive systems
and Optical filters
Adaptive systems 1407
UF †Adaptive control
†Adaptive electric filters
†Adaptive optical filters
NT Learning machines
RT Artificial intelligence
Automata theory
—Automatic control
Cybernetics
Process control
Self organizing systems
Adcock antennas 0905
BT Antennas
Directional antennas
Adders
USE Adding circuits
Adder subtracters
USE Adding circuits
Adding circuits 0901
UF Adders
Adder subtracters
Subtracters
BT Circuits
RT Accumulators (computers)
Computer components
—Logic circuits
Adding machines 1505
BT Calculators
Office equipment
Office machines
Addisons disease 0605
BT Adrenal cortex diseases
Endocrine diseases
Hypoadrenalism
RT Hypotension
—Tuberculosis
Addition 1201
UF Summing
BT Arithmetic
Number theory
Addition polymerization 0703
BT Addition reactions
Chemical reactions
Polymerization
RT—Addition resins
Condensation polymerization
—Elastomers
Graft polymerization
—Polyether resins
—Thermoplastic resins
—Thermosetting resins
Addition polymers
USE Addition resins
Addition reactions 0703
BT Chemical reactions
NT Addition polymerization
RT—Alkylation
Amination
Carbonylation
Carboxylation
Decarboxylation
Esterification
Etherification
Grignard reactions
—Halogenation
Hydration
—Hydrogenation
Metalation
Nitration
Phosphorylation
Addition resins 1109 1110
Carbon-chain polymers; for heteroatom chain polymers see Polyether resins
UF Addition polymers
NT ABS resins
Acrylamide copolymers
—Acrylate copolymers
Acrylic acid copolymers
—Acrylic copolymers
—Acrylic resins
—Acrylonitrile copolymers
Butyl rubber
—Chloroprene resins
—Diene resins
Ethylene copolymers
—Ethylene resins
—Halocarbon resins
—Olefin copolymers
—Olefin resins
Polyacrylamides
—Polyacrylates
Polyacrylic acids
Polyacrylonitrile
Polybutadiene
Polychloroprene
Polychlorotrifluoroethylene
Polyethylene
Polyisobutylene
Polyisoprene
Polymethyl methacrylate
Polypropylene
Polystyrene
Polyvinyl acetate
Polyvinyl alcohol
Polyvinyl chloride
Polyvinyl fluoride
Styrene butadiene resins
—Styrene copolymers
—Styrene resins
Tetrafluoroethylene resins
Vinyl acetal resins
Vinyl acetate
Vinyl acetate copolymers
—Vinyl acetate resins
Vinyl chloride copolymers
—Vinyl chloride resins
—Vinyl copolymers
Vinyl ether resins
Vinylidene chloride resins
—Vinylidene resins
—Vinyl resins
RT Addition polymerization
—Crosslinking
Foam rubber
Graft polymerization
—Plastics processing
—Polymeric films
—Synthetic fibers
—Vulcanized elastomers
Additions (enlargements)
USE Extensions
Additives 1107
UF Doping (additives)
Modifiers
†Mud additives
NT Admixtures
Antiicing additives
Antiknock additives
Cement additives
Extreme pressure additives
Food additives
—Fuel additives
Liquid rocket additives
Lubricant additives
Metal deactivators
Paint thinners
Pulp additives
RT Antifreezes
Antioxidants
Antistatic agents
—Brighteners
—Coatings
Corrosion inhibitors
—Diluents
Dopes
—Drying oils
Extenders
Fillers
Gelling agents
Interstitials
—Lubricants
Naphthas
Opacifiers
—Pigments
—Plasticizers
—Preservatives
—Solvents
Stabilizers (agents)
Thickeners (materials)
Thickness
Additrons
USE Radial beam tubes
Addressing 1407
RT—Coding
—Computer programming
Address registers
USE Registers (computers)
Adenines 0601 0703
6-Aminopurine and its derivatives
BT Heterocyclic compounds
Nitrogen heterocyclic compounds
Nitrogen heterocyclics with 4 N
Purines
NT—Adenosines
Puromycin
Adenocarcinomas 0605
BT Malignant neoplasms
Neoplasms
RT Breast carcinoma
Adenoma 0605
BT Benign neoplasms
Neoplasms
RT—Breast neoplasms
Adenosine phosphates 0601 0703
BT Esters
Nucleotides
Organic phosphates
Phosphorus organic acid esters
Phosphorus organic compounds
Adenosines 0703 0601
BT Adenines
Heterocyclic compounds
Nitrogen heterocyclic compounds
Nitrogen heterocyclics with 4 N
Nucleosides
Purines
NT Puromycin
Adenoviruses 0613
BT Viruses
NT Acute respiratory disease virus
Oncogenic viruses
Polyoma viruses
Adenovirus infections
USE Respiratory infections
Adherence
USE Adhesion
Adhesion 1407
UF Adherence
Sticking (adhesion)
Tackiness
BT Surface properties
RT Adhesive bonding
—Adhesives
Adhesive strength
Adsorption
—Bonding
Cementing
Cohesion
Dissimilar materials bonding
Fusion (melting)
Gluing
Internal pressure
Laminating
Peeling
—Sealing
Seaming
—Shear tests
Surface chemistry
Taping
Wetting
Adhesions (intestines) 0605
RT—Gastrointestinal diseases
—Intestinal obstructions
Adhesion tests 1402
UF Adhesive tests
NT Peel tests
Adhesive bonding 1308
BT Bonding
RT Adhesion
Dissimilar materials bonding
Adhesive papers 1112 1101
BT Papers
RT Adhesive tapes
Adhesive peel test
USE Peel tests
Adhesives 1101
UF †Binders (adhesives)
Cements (adhesives)
NT Glue
Pressure sensitive adhesives
Rubber adhesives
RT Adhesion
Binders (materials)
Bonding strength
Cohesion
Epoxy resins
—Fasteners
—Joints (junctions)
—Sealers
Setting time
Adhesive strength 2012
BT Mechanical properties
RT Adhesion
Bonding strength
Peel strength
Shear strength
—Surface properties
Tensile strength
Adhesive tapes 1101
BT Binding tapes
RT Adhesive papers
Adhesive tests
USE Adhesion tests
Adiabatic conditions 2013
RT Enthalpy
—Environments
Heat
—Temperature
Adiabatic demagnetization 2012
UF Magnetic cooling
BT Cooling
RT Cryogenics
—Refrigerating
Adiabatic flow 2004
BT Fluid flow
Adies syndrome 0605
BT Eye diseases
Signs and symptoms
Adipates 0703
BT Aliphatic acid esters
Carboxylic acid esters
Dibasic acid esters
Esters
Adiphenine 0615
RT Cholinergic blocking agents
Adipic acid 0703
BT Aliphatic acids
Carboxylic acids
Dibasic organic acids
Organic acids
Adiponitrile 0703
BT Nitriles
Adipose tissue
USE Connective tissue
Adits 0809
BT Tunnels
RT Mine shafts
Adjective law 0504
BT Law (jurisprudence)
Public law
RT Common law
Criminal law
Decisional law
—Substantive law
Adjusting 1407
UF †Self adjusting
RT Accounting
Alignment
Clearances
Collimation
Correction
—Fitting
Focusing
Leveling
Matching
Positioning
Revisions
Setting (adjusting)
Smoothing
Straightening
Adjustment (psychology) 0510
UF Maladjustment
BT Adaptation
RT Abnormal psychology
Anxiety

Fig. 2

ECCENTRICITY
IRREGULARITIES
UNIQUENESS

ABORIGINES
0404 3402
RT ANTHROPOLOGY
HUMAN BEINGS
INHABITANTS

ABORT APPARATUS
0203 3102 3103
BT SAFETY DEVICES
RT ABORTED MISSIONS
AIRCRAFT SAFETY
ARRESTING GEAR
BARRIERS
#BRAKES (FOR ARRESTING MOTION)
#DRAG DEVICES
EJECTION SEATS
EQUIPMENT
ESCAPE CAPSULES
ESCAPE ROCKETS

ABORT TRAJECTORIES
1904 3006 3102 3103
BT #TRAJECTORIES
RT ABORTED MISSIONS
MATTS (SYSTEMS)

ABORTED MISSIONS
3102 3103
RT ABORT APPARATUS
ABORT TRAJECTORIES
DESTRUCTION
ENGINE FAILURE
ESCAPE CAPSULES
ESCAPE ROCKETS
FAILURE
MALFUNCTIONS
MISSIONS

ABRASION
0405 1504 1801 1806
RT ABRASIVES
CHIPPING
CLEANING
CUTTING
DRY FRICTION
EROSION
FILES (TOOLS)
#FRICTION
GRINDING (MATERIAL REMOVAL)
LESIONS
METALLOGRAPHY
#POLISHING
SCORING
WEAR

ABRASION RESISTANCE
1503 1504
BT #MECHANICAL PROPERTIES
RT HARDNESS
RESISTANCE
TOUGHNESS

ABRASIVES
1504 1801 1805 1806
NT CARBORUNDUM (TRADEMARK)
RT ABRASION
ALUMINUM OXIDES
CERAMICS
DIAMONDS
GRIT
PUMICE
QUARTZ
SILICON CARBIDES

ABSCISSAS
USE #COORDINATES

ABSOLUTE TEMPERATURE SCALES
USE TEMPERATURE SCALES

ABSORBENTS
0602 0603 1805
UF MOLECULAR SIEVES
BT SORBENTS
RT ABSORBERS
ABSORBERS (EQUIPMENT)
ABSORBERS (MATERIALS)
ADSORBENTS
AIR CONDITIONING EQUIPMENT
DESICCANTS
MATERIAL ABSORPTION
MATERIALS

ABSORBERS
0603 1409 1504 2202 2405 2901 3203
3303

(USE OF A MORE SPECIFIC TERM IS
RECOMMENDED--CONSULT THE TERMS
LISTED BELOW)
RT ABSORBENTS
ABSORBERS (EQUIPMENT)
ABSORBERS (MATERIALS)
#ATTENUATORS
CLEANERS
OSCILLATION DAMPERS
SHOCK ABSORBERS
VIBRATION ISOLATORS

ABSORBERS (EQUIPMENT)
0602 1504
(EXCLUDES EQUIPMENT FOR ABSORBING
ENERGY)
RT ABSORBENTS
ABSORBERS
ABSORBERS (MATERIALS)
AIR CONDITIONING EQUIPMENT
CLEANERS
COLUMNS (PROCESS ENGINEERING)
CONDENSERS (LIQUIFIERS)
COOLING SYSTEMS
DEGASSING
DRYING APPARATUS
EQUIPMENT
MATERIAL ABSORPTION
REFRIGERATING MACHINERY
SHOCK ABSORBERS

ABSORBERS (MATERIALS)
0602 1504 1805
(EXCLUDES ABSORBENTS--LIMITED TO
MATERIALS FOR ABSORBING RADIATION
RATHER THAN OTHER MATERIALS)
NT NEUTRON ABSORBERS
RADAR ABSORBERS
SOLAR ENERGY ABSORBERS
RT ABSORBENTS
ABSORBERS
ABSORBERS (EQUIPMENT)
#ATTENUATORS
CLEANERS
ELECTROMAGNETIC ABSORPTION
#ELECTROMAGNETIC WAVE FILTERS
#ENERGY ABSORPTION
FILTERS
HEAT SINKS
INSULATION
JACKETS
MATERIALS
RADIATION SHIELDING
REFRIGERANTS
#SHIELDING
SINKS
STOPPING POWER
SUPPRESSORS

ABSORPTANCE
2310
BT #ELECTROMAGNETIC PROPERTIES
OPTICAL PROPERTIES
RT ABSORPTION SPECTRA
ABSORPTIVITY
ALBEDO
CAPTURE EFFECT
COSMIC RAY ALBEDO
DENSITY (MASS/VOLUME)
EARTH ALBEDO
ELECTROMAGNETIC ABSORPTION
LIGHT TRANSMISSION
OPACITY
REFLECTANCE
#SURFACE PROPERTIES
#TRANSMISSION
TRANSMISSIVITY
TRANSMITTANCE
TRANSPARENCE
TURBIDITY

ABSORPTION
3407 3408
(USE OF A MORE SPECIFIC TERM IS
RECOMMENDED--CONSULT THE TERMS
LISTED BELOW)
RT ABSORPTION SPECTRA
ADSORPTION
ATOMIC COLLISIONS
#ATTENUATION
BENEFICIATION
CAPTURE EFFECT
COLLISION PARAMETERS

A E MECHANICS
USE AVIATION MECHANICS

ABILITY
UF LOW ABILITY
NT ACADEMIC ABILITY
COGNITIVE ABILITY
INTELLIGENCE
LANGUAGE ABILITY
PREDICTIVE ABILITY (TESTING)
PSYCHOMOTOR SKILLS
VERBAL ABILITY
RT ABILITY GROUPING
ABILITY IDENTIFICATION
ACHIEVEMENT
APTITUDE
ASPIRATION
GIFTED
HANDICAPPED
MECHANICAL SKILLS
PERFORMANCE
PRODUCTIVITY
SLOW LEARNERS
TALENT
TALENTED STUDENTS

ABILITY GROUPING
BT STUDENT GROUPING
RT ABILITY
ABILITY IDENTIFICATION
HOMOGENEOUS GROUPING
LOW ABILITY STUDENTS

ABILITY IDENTIFICATION
BT IDENTIFICATION
RT ABILITY
ABILITY GROUPING
IDENTIFICATION TESTS

ABLE STUDENTS
(ABILITY TO PERFORM OR ABSORB EDUCATION AT A SPECIFIED LEVEL)
UF CAPABLE STUDENTS
BT STUDENTS
RT ACADEMIC ABILITY
ACADEMIC ACHIEVEMENT
ADVANCED STUDENTS
AVERAGE STUDENTS
GIFTED
SUPERIOR STUDENTS

ABSTRACT BIBLIOGRAPHIES
USE ANNOTATED BIBLIOGRAPHIES

ABSTRACT REASONING
BT THOUGHT PROCESSES
RT COGNITIVE PROCESSES
LOGICAL THINKING
PRODUCTIVE THINKING

ABSTRACTING
BT WRITING
RT DOCUMENTATION
INDEXING

ABSTRACTION TESTS
BT TESTS
RT COGNITIVE TESTS
COMPARATIVE TESTING

ACADEMIC ABILITY
UF SCHOLASTIC ABILITY
BT ABILITY
RT ABLE STUDENTS
ACADEMIC ACHIEVEMENT
ACADEMIC APTITUDE
ACADEMIC ASPIRATION
ACADEMIC PERFORMANCE
ACADEMICALLY HANDICAPPED
AVERAGE STUDENTS
COGNITIVE ABILITY
INTELLIGENCE
LOW ABILITY STUDENTS
STUDENT ABILITY
STUDENTS
VERBAL ABILITY

ACADEMIC ACHIEVEMENT
UF ACADEMIC PROGRESS
ACADEMIC SUCCESS
EDUCATIONAL ACHIEVEMENT
EDUCATIONAL ATTAINMENT
EDUCATIONAL LEVEL
SCHOLASTIC ACHIEVEMENT
SCHOOL ACHIEVEMENT
STUDENT ACHIEVEMENT
BT ACHIEVEMENT
RT ABLE STUDENTS
ACADEMIC ABILITY
ACADEMIC APTITUDE
ACADEMIC ASPIRATION
ACADEMIC PERFORMANCE
ACADEMIC PROBATION
ACHIEVEMENT RATING
ADVANCED PLACEMENT
GIFTED
GRADES (SCHOLASTIC)
HIGH ACHIEVERS
INTELLIGENCE
LEARNING DIFFICULTIES
LOW ACHIEVERS
READING ACHIEVEMENT
STUDENTS
SUPERIOR STUDENTS
UNDERACHIEVERS

ACADEMIC APTITUDE
UF LOW SCHOLASTIC APTITUDE
SCHOLASTIC APTITUDE
STUDENT APTITUDE
BT APTITUDE
RT ACADEMIC ABILITY

ERIC
Dec. 1967

Fig. 3

 FAA Thesaurus of technical descriptors 1969

Fig. 4

A

ABANDONMENT
UF Escape (Abandonment)
NT BAILOUT
RT DITCHING

ABDOMEN
BT BODY

Abelian fields
USE ALGEBRA

ABLATION
RT AERODYNAMIC HEATING
AEROTHERMOELASTICITY
COOLING
EROSION
SUBLIMATION
VAPORIZATION

ABNORMAL PSYCHOLOGY
(Includes general investigations of irregular mental phenomena including behavior or mental disorders, dreams, hallucinations, and mental retardation. For prevention, diagnosis, and therapy of emotional disturbances, see PSYCHIATRY.)
UF Clinical psychology
Psychopathology
BT PSYCHOLOGY
NT PSYCHIATRY
STRESS (PSYCHOLOGY)
RT ANXIETY
BEHAVIOR
CRIMINOLOGY
EMOTIONS
FEAR
SENSORY DEPRIVATION

Abrasion
USE ABRASIVES

Abrasion resistance
USE WEAR RESISTANCE

Abrasive coatings
USE ABRASIVES

ABRASIVES
UF Abrasion
Abrasive coatings
Broach powders
Commutator stones
Grinding materials
RT CORUNDUM
DIAMONDS

ABSORPTION
(The retention and conversion into another form of energy of rays, waves, or particles by a substance.)
RT ACOUSTIC INSULATION
ATTENUATION
DESICCANTS
RESONANCE ABSORPTION
SHIELDING
SURFACE PROPERTIES
VIBRATION ISOLATORS

Abstracting
USE ABSTRACTS

ABSTRACTS
UF Abstracting
Briefs
Resumes
Summaries
BT DOCUMENTATION
RT REPORTS

ABUNDANCE
UF Availability

Acaricides
USE PESTICIDES

ACCELERATION
UF G-forces
BT MOTION
RT DECELERATION
THRUST
VELOCITY

Acceleration integrators
USE ACCELEROMETERS

ACCELERATION TOLERANCE
BT TOLERANCES (PHYSIOLOGY)
RT BLACKOUT (PHYSIOLOGY)

ACCELEROMETERS
UF Acceleration integrators

ACCEPTABILITY
RT MAINTAINABILITY
QUALITY CONTROL
STANDARDS
TOLERANCES (MECHANICS)

ACCIDENT INVESTIGATION
RT ACCIDENTS
AVIATION ACCIDENTS
AVIATION INJURIES
AVIATION SAFETY

ACCIDENTS
NT AVIATION ACCIDENTS
COLLISIONS
MOTOR VEHICLE ACCIDENTS
RT ACCIDENT INVESTIGATION
CASUALTIES
DISASTERS
EXPLOSIONS
FIRES
FIRST-AID
HAZARDS
RESCUES
SAFETY
SURVIVAL
WOUNDS & INJURIES

ACCLIMATIZATION
(Physiological adjustment to climatic conditions.)
BT ADAPTATION (PHYSIOLOGY)

ACHIEVEMENT TESTS
(Standardized educational tests constructed to sample the proficiency level or adequacy of past learning in any given field of study.)
BT PSYCHOMETRICS
RT INTELLIGENCE TESTS
PSYCHOMOTOR TESTS

ACID-BASE EQUILIBRIUM

Acidemia
USE ACIDOSIS

Acidity
USE PH

ACIDOSIS
UF Acidemia

ACOUSTIC DETECTORS
BT ACOUSTIC EQUIPMENT
DETECTION
DETECTORS
RT MICROPHONES
POSITION FINDING

ACOUSTIC EQUIPMENT
UF Sound equipment
NT ACOUSTIC DETECTORS
ACOUSTIC FILTERS
ANECHOIC CHAMBERS
ELECTROACOUSTIC TRANSDUCERS
HYDROPHONES
MEGAPHONES
MICROPHONES
NOISE GENERATORS
SOUND GENERATORS
SOUND REPRODUCTION SYSTEMS
RT HARMONIC ANALYZERS
HARMONIC OSCILLATORS
NOISE

ACOUSTIC FILTERS
BT ACOUSTIC EQUIPMENT

ACOUSTIC IMPEDANCE
UF Impedance (Acoustics)
BT ACOUSTIC PROPERTIES
RT IMPEDANCE MATCHING

ACOUSTIC INSULATION
UF Insulation (Acoustic)
Insulators (Acoustic)
Soundproofing
RT ABSORPTION

ACOUSTIC PROPERTIES
UF Physical properties (Acoustic)
NT ACOUSTIC IMPEDANCE
SOUND TRANSMISSION
RT HARMONIC ANALYZERS
HARMONIC OSCILLATORS
NOISE
RESONANCE
STANDING-WAVE RATIOS

ACOUSTIC RANGES
RT HYDROPHONES

ACOUSTICS
(Theoretical studies of the production, behavior, and reception of elastic stress waves in all type of media. For theoretical studies of waves in the audible frequency, see SOUND.)
RT ANECHOIC CHAMBERS
MECHANICAL WAVES
PSYCHOACOUSTICS
SOUND
ULTRASONIC RADIATION

ACRYLIC RESINS
UF Lucite
Perspex
Plexiglas
Polymethylmethacrylate
BT PLASTICS

Activated carbon
USE CARBON

ACTUATORS
(For actuators with feedback, see SERVOMECHANISMS. For indicators, see SYNCHROS.)
NT EXPLOSIVE ACTUATORS
HYDRAULIC ACTUATORS
RT SERVOMECHANISMS
SOLENOIDS

ACUITY
NT VISUAL ACUITY
RT PERCEPTION
SENSORY MECHANISMS
THRESHOLDS (PHYSIOLOGY)
TOUCH

Adaptability (Psychology)
USE ADJUSTMENT (PSYCHOLOGY)

ADAPTATION (PHYSIOLOGY)
UF Altitude adaptation
Dark adaptation
General adaptation syndrome
Light adaptation
Night vision
NT ACCLIMATIZATION
RT STRESS (PHYSIOLOGY)

ADAPTIVE CONTROL SYSTEMS
(Control systems that continuously measure and evaluate dynamic performance and supply continuous readjustments on the basis of the evaluations.)
UF Self-adaptive control systems
BT CONTROL SYSTEMS

ADDITIVES
NT ANTIOXIDANTS
FUEL ADDITIVES
LUBRICANT ADDITIVES

Adenine
USE PURINES

Adenine derivatives
USE PURINES

Adenosine
USE PURINES

ADENOSINE PHOSPHATES
UF Adenylic acid
ADP
ATP
RT MUSCLES
NUCLEOSIDES
NUCLEOTIDES

Adenylic acid
USE ADENOSINE PHOSPHATES

ADHESION
RT BONDING
SURFACE PROPERTIES

ADHESIVE TAPES
BT ADHESIVES
TAPES

ADHESIVES
UF Glues
Metal-glass adhesives
Metal-plastic adhesives
Metal-rubber adhesives
Metal-wood adhesives
NT ADHESIVE TAPES
SEALING COMPOUNDS
RT GAS SEALS
JOINTS
METAL JOINTS
METAL SEALS
SEALS (STOPPERS)

Adjustable-pitch propellers
USE VARIABLE PITCH PROPELLERS

ADJUSTMENT (PSYCHOLOGY)
UF Adaptability (Psychology)
BT BEHAVIOR
RT CONDITIONED REFLEX
GROUP DYNAMICS
LEADERSHIP
PSYCHOLOGY

ADMITTANCE

Adrenal cortex hormones
USE CORTICOSTEROID AGENTS

ADRENAL GLANDS
BT ENDOCRINE GLANDS
GLANDS

ADRENAL MEDULLA HORMONES
BT HORMONES
NT EPINEPHRINE
LEVARTERENOL
RT AUTONOMIC AGENTS
SYMPATHOMIMETIC AGENTS

Adrenalin
USE EPINEPHRINE

Adrenergic agents
USE SYMPATHOMIMETIC AGENTS

Adrenergic nerves
USE AUTONOMIC NERVOUS SYSTEM

ADRENOCORTICOTROPIC HORMONE
UF Corticotropin
BT HORMONES

ADRENOCORTICOTROPIC HORMONES
UF ACTH
Corticotropin
BT HORMONES
PITUITARY HORMONES

Adsorbents
USE ADSORPTION

ADSORPTION
UF Adsorbents
BT SORPTION
SURFACE PROPERTIES

Aeolipile rotors
USE JET HELICOPTER ROTORS

AERIAL CAMERAS
BT CAMERAS
RT RADAR RECORDING CAMERAS
WIDE-FIELD CAMERAS

AERIAL PHOTOGRAPHS
BT PHOTOGRAPHS
RT MOTION PICTURES

AERIAL PHOTOGRAPHY
BT PHOTOGRAPHY
RT AERIAL RECONNAISSANCE

AERIAL PICKUP SYSTEMS
BT AIRCRAFT EQUIPMENT
RT AIR-DROP OPERATIONS

Aerial propellers
USE PROPELLERS (AERIAL)

AERIAL RECONNAISSANCE
RT AERIAL PHOTOGRAPHY
AIR FORCE OPERATIONS
PHOTO INTERPRETATION
PHOTOGRAMMETRY
RECONNAISSANCE PLANES

AERIAL RUDDERS
UF Rudders (Aerial)

NAL. Agricultural/Biological Vocabulary. Cycle 1 Oct 1967.

Fig. 5

+ (2-CHLOROETHYL) TRIMETHYLAMMONIUM CHLORIDE 11E
+ UF CCC
+ CYCOCEL
+ BT PLANT REGULATORS

+ ABACARUS HYSTRIX 07E
+ UF GRAIN RUST MITE

+ ABGRALLASPIS 07E
+ BT DIASPIDIDAE

+ ABGRALLASPIS HOWARDI 07E
+ UF HOWARD SCALE

+ ABIES 11F
+ UF FIR
+ BT CONIFERAE

+ ABIES ALBA 11F
+ UF SILVER FIR

+ ABIES AMABILIS 11F
+ UF AMABILIS FIR
+ CASCADES FIR
+ PACIFIC SILVER FIR

+ ABIES BALSAMEA 11F
+ UF BALSAM FIR

+ ABIES CEPHALONICA 11F
+ UF GREEK FIR

+ ABIES CONCOLOR 11F
+ UF WHITE FIR

+ ABIES GRANDIS 11F
+ UF GRAND FIR
+ LOWLAND FIR

+ ABIES LASIOCARPA 11F
+ UF ALPINE FIR

+ ABIES MAGNIFICA 11F
+ UF CALIFORNIA RED FIR
+ RED FIR

+ ABIES PINDROW 11F
+ UF PINDROW FIR

+ ABIES PINSAPO 11F
+ UF SPANISH FIR

+ ABIES PROCERA 11F
+ UF NOBLE FIR

+ ABIES RELIGIOSA 11F
+ UF PINABETE
+ SACRED FIR

+ ABIES SACHALINENSIS 11F
+ UF SAKHALIN FIR

+ ABIES SIBIRICA 11F
+ UF SIBERIAN FIR

+ ABIES VENUSTA 11F
+ UF BRISTLECONE FIR

@ ABNORMALITIES 10
+ UF ANOMALIES

+ ABORTUS-BANG-RING TEST
+ USE MILK RING TEST 04B

+ ABR TEST
+ USE MILK RING TEST 04B

+ ABUTILON THEOPHRASTI
+ USE CHINA JUTE 11A

+ ACACIA 11C
+ UF WATTLE (TREE)
+ BT LEGUMINOSAE

+ ACACIA ARABICA 11F
+ UF BABUL ACACIA

+ ACACIA CATECHU 11C
+ UF KHAIR

+ ACALYMMA VITTATUM 07E
+ UF CUCUMBER BEETLE
+ STRIPED CUCUMBER BEETLE

+ ACANTHOCEPHALA 04B
+ BT NEMATHELMINTHES

+ ACANTHOLYDA ERYTHROCEPHALA 07E
+ UF PINE FALSE WEBWORM

@ ACANTHOMA 10E
+ BT NEOPLASMS

+ ACANTHOSCELIDES OBTECTUS 07F
+ UF BEAN WEEVIL

@ ACARIASIS 04B
+ RT MITES

+ ACARID MITES
+ USE ACARIDAE 07H

+ ACARIDAE 07H
+ UF ACARID MITES
+ NT TYROPHAGUS
+ BT MITES

+ ACARINA 07H
+ NT MITES
+ TICKS
+ BT ARACHNIDA

+ ACARUS SIRO 07F
+ UF CHEESE MITE
+ GRAIN MITE

+ ACER 11F
+ UF MAPLE
+ BT ACERACEAE

+ ACER MACROPHYLLUM 11F
+ UF BIGLEAF MAPLE
+ BROADLEAF MAPLE

+ ACER NEGUNDO 11C
+ UF BOXELDER

+ ACER PALMATUM 11F
+ UF JAPANESE MAPLE

+ ACER PLATANOIDES 11F
+ UF NORWAY MAPLE

+ ACER PSEUDOPLATANUS 11F
+ UF PLANETREE MAPLE

+ ACER RUBRUM 11F
+ UF RED MAPLE

 Subject Headings used by the AEC. TID 5001 (5th Rev) Jan 1969.

Fig 6

SUBJECT HEADINGS

A

A-1 Reactor
see Food Irradiation Facilities
A-1 Reactor (Czechoslovakia)
see Bohunice Power Reactor, Unit 1
A1W
see Carrier Vessel Reactor
A2W
see Carrier Vessel Reactor
A3W
see Carrier Vessel Reactor
A-286 (IRON ALLOY)
xx CHROMIUM ALLOYS AND SYSTEMS
xx IRON ALLOYS AND SYSTEMS
xx MANGANESE ALLOYS AND SYSTEMS
xx MOLYBDENUM ALLOYS AND SYSTEMS
xx NICKEL ALLOYS AND SYSTEMS
xx TITANIUM ALLOYS AND SYSTEMS
A-esterase
see Arylesterase
A. LINCOLN CLAIM (MONT.)
x Lincoln Claim, A. (Mont.)
AARR
see Argonne Advanced Research Reactor
Ab 132
see Carbamic Acid, Bis(2,2-dimethyl-1-aziridinyl)phosphinyl-, Ethyl Ester
ABAJO MOUNTAINS DISTRICT (UTAH)
ABDOMEN
see also Peritoneum
ABDOMINAL VISCERA
see also Bladder
see also Gall Bladder
see also Intestine
see also Kidneys
see also Liver
see also Pancreas
see also Spleen
see also Stomach
xx VISCERA
Abdoun-Oulan Basin (Morocco)
see Oulan-Abdoun Basin (Morocco)
ABE LINCOLN MINE (ARIZ.)
ABERDEEN FAST PULSE REACTOR FACILITY
x APRF
x Army Pulse Radiation Facility (Aberdeen)
xx REACTORS, FAST
xx REACTORS, TEST
ABIQUIN DISTRICT (N. MEX.)
ABLATION
(Non-surgical)
xx HEAT TRANSFER
Able Burst
see Buster-Jangle Operation
Abnormalities
see Dysplasia
ABRASION
see also Erosion
see also Grinding
see also Polishing
see also Wear
xx EROSION
xx FRICTION
xx WEAR
ABRASIVES
Absorption Cross Sections
see Cross Sections
ABSORPTION SPECTRA
see also Atomic Absorption Spectrometry
xx SPECTRA
ACANTHOCEPHALA
xx ANIMALS
ACCELERATION
see also Velocity
x Deceleration
xx VELOCITY
Acceleration Integrators
see Accelerometers
Accelerator-Pulsed Fast Assembly
see Critical Assemblies
Accelerator Storage Rings
see Storage Rings
Accelerator Targets
see Radiation Targets
ACCELERATOR TUBES
xx POWER SUPPLIES
xx TUBES
ACCELERATORS
see also Beam Separators
see also Betatrons
see also Brookhaven Synchrotron
see also Calutrons
see also Cockcroft-Walton Accelerators
see also Cyclotrons
see also Electron-Ring Accelerators
see also Electrostatic Generators
see also FFAG Synchrotrons
see also Gravimeters
see also Linear Accelerators
see also Materials Testing Accelerators
see also Plasma Accelerators
see also Storage Rings
see also Synchrocyclotrons
see also Synchrotrons
see also Van de Graaff Accelerators
x Heavy Particle Accelerators
x Particle Accelerators
xx GRAVIMETERS
xx STORAGE RINGS
ACCELEROMETERS
x Acceleration Integrators
xx GAGES AND METERS
xx TRANSDUCERS
ACCIDENTS
see also Disasters
see also Reactor Safety
x Criticality Accidents
xx DISASTERS
xx SAFETY
ACCOUNTING
see also SF Materials Accounting
Accumulators
see Storage Batteries
ACE CREEK PROSPECT (SASKATCHEWAN)
Ace Event
see Plowshare Project
ACE LAKE (SASKATCHEWAN)
ACE LAKE AREA (SASKATCHEWAN)
ACE MINE (NORTHWEST TERRITORIES)
ACENAPHTHENE
ACENAPHTHENE, 1-METHOXY-
ACENAPHTHENEQUINONE
ACENAPHTHYLENE
ACENES
Aces
see Elementary Particles
ACETALDEHYDE
ACETALDEHYDE--AMMONIA
x Ethanol, 1-Amino-
ACETALDEHYDE, 2-CHLORO-
Acetaldehyde, Hydroxy-
see Glycolaldehyde
ACETALDEHYDE, PHENYL-
ACETALDEHYDE, TRIBROMO-
x Bromal
Acetaldehyde, Trichloro-
see Chloral
ACETALDEHYDE, TRIFLUORO-
x Fluoral
ACETALS
x Formals
ACETAMIDE
see also Diacetamide
x Acetic Acid, Amide
Acetamide, 2,2-Dichloro-N-[β-hydroxy-α-(hydroxymethyl-p-nitrophenethyl]-
see Chloramphenicol
ACETAMIDE, N,N-DIMETHYL-
ACETAMIDE, N-ETHYL-
ACETAMIDE, N-FLUOREN-2-YL-
ACETAMIDE, 2-FLUORO-
ACETAMIDE, 2-IODO-
ACETAMIDE, 2-MERCAPTO-N-2-NAPHTHYL-
x Thionalide
Acetamide, N-[2-(5-Methoxyindol-3-yl)ethyl]-
see Melatonin
ACETAMIDE, N-METHYL-
ACETAMIDE, THIO-
ACETAMIDE, TRICHLORO-
ACETAMIDE, 2,2,2-TRIFLUORO-

Fig 7

ACADEMIC STANDARDS
RT 3001
ACCREDITATION●
ADMISSION●

ACADEMIC SUCCESS
USE ACHIEVEMENT

ACCELERATION
SN THE PROCESS OF PROGRESSING THROUGH THE SCHOOL GRADES AT A RATE FASTER THAN THAT OF THE AVERAGE CHILD
UF SKIPPING
RT 6004
ADVANCED PLACEMENT PROGRAM●
RATE

ACCENTUATION
SN SPEECH
RT 9004
SPEAKING

ACCEPTANCE
SN GENERAL ATTITUDE OF ONE PERSON TOWARD ANOTHER
RT 7003

ACCIDENT
SN *
RT 8001
ACCIDENT PREVENTION●
TRAFFIC SAFETY●

ACCIDENT INSURANCE
RT 13001

ACCIDENT PREVENTION
RT 2007
ACCIDENT●
SCHOOL INJURY●

ACCIDENTAL ERROR
SN UNPREDICTABLE DEPARTURE FROM THE TRUE VALUE
RT 6005
MEASUREMENTS●

ACCOMPLISHMENT
USE ACHIEVEMENT

ACCOUNTANT
RT 1008

ACCOUNTING
RT 17006

ACCREDITATION
SN OF EDUCATIONAL INSTITUTIONS
RT 2007
ACADEMIC STANDARDS●

ACCULTURATION
USE CULTURAL ASSIMILATION

ACCURACY
UF CORRECTNESS
PRECISION
RT 6003
CLARITY
CONSISTENCY●
ERROR

ACHIEVEMENT
UF ACADEMIC IMPROVEMENT
ACADEMIC SUCCESS
ACCOMPLISHMENT
ATTAINMENT
IMPROVEMENT
PERFORMANCE
NT OVERACHIEVEMENT
UNDERACHIEVEMENT
RT 6004
ACHIEVEMENT TEST●
COURSE COMPLETION●
LEARNING RATE●
REMEDIAL TEACHING●
SCHOLASTIC PRORATION●
SCORE●

ACHIEVEMENT TEST
UF EDUCATIONAL TEST
RT 2002
ACHIEVEMENT●

ACHROMATIC COLOR
UF BLACK AND WHITE
RT 9003

ACOUSTICS
SN SOUND AFFECTING QUALITIES OF A ROOM
RT 9004

ADAPTABILITY
RT 7003
SOCIALIZATION

ADDICTION
RT 8001
DRUGS●
JUVENILE DELINQUENCY
MENTAL HEALTH

ADDITION
SN ARITHMETICAL CALCULATION
RT 17005

ADEQUACY
SN OF AMOUNT OF SUPPLIES OR STAFF
UF INSUFFICIENCY
SUFFICIENCY
RT 3002
ABILITY
ACHIEVEMENT
FEELING OF INADEQUACY

ADJECTIVES
RT 16001

ADJUSTMENT
SN *
RT 2021
SOCIAL ADJUSTMENT

ADMINISTRATING
SN *
UF COORDINATING
MANAGING
RT 2007
DECISION MAKING●
TEACHER ADMINISTRATION RELATIONS
TEST ADMINISTRATION

ADMISSION
SN ADMITTANCE TO A SCHOOL
UF ENTRANCE
MATRICULATION
NT EARLY ADMISSION
RT 2010
ACADEMIC STANDARDS●
ADMISSION TEST●

ADMISSION TEST
RT 2002
ADMISSION●

ADOLESCENCE
SN AGE TWELVE TO TWENTY ONE
UF TEEN AGE
NT EARLY ADOLESCENCE
LATE ADOLESCENCE
MID ADOLESCENCE
RT 8005

ADOPTION
USE LEGAL ADOPTION

ADULT
SN
BT
RT

ADULT EDU
SN
RT

ADVANCED
RT

ADVANCEME
USE

ADVERBS
RT

ADVERTISI
RT

ADVISING
USE

ADVISOR
USE

AESTHETI
RT

AFFECT
SN
NT

RT

AFFECT T
RT

AFFECTIC
SN
RT

AFFECTIV
BT
NT

RT

AFFECTIV
SN

RT

AGE
USE

AGED
USE

AGGRESS
BT
RT

EJC - DOD Thesaurus Fig 8 -30-

Amides (Con.)
. . Thioureas
. . . Fibrinolysin
. . Urea

Amines
. Acyclic amines
. . Diethylamine
. . Dimethylamine
. . Ethanolamine
. . Ethylamine
. . Methylamine
. Amidines
. Aralkylamines
. . Benzylamine
. . Diethylpropion
. . Dopamine
. . Epinephrine
. . Mephentermine
. . Methylene blue
. . Norepinephrine
. . Phenoxybenzamine
. . Trimethobenzamide
. . Tyramine
. Arylamines
. . Anilines
. . . Oxophenarsine
. . . Sulfanilamide
. . . Sulfanilic acid
. . . Toluidines
. . Diphenylamine
. . Methylene blue
. . Phentolamine
. . Phenylenediamines
. Catecholamines
. . Dopamine
. . Epinephrine
. . Norepinephrine
. Fluoroamines
. Heterocyclic amines
. . Hexamethylenetetramine
. . Physostigmine
. . Piperidines
. . . Meperidine
. . . Mepivacaine
. . . Methylphenidate
. . . Pipradrol
. . . Thalidomide
. . . Trihexylphenidyl
. . Tropanes
. . . Atropine
. . . Cocaine
. . . Hyoscyamine
. . . Scopolamine
. Melamines
. Nitramines
. Polyamines
. . Diamines
. . . EDTA
. . . Ethylenediamine
. . . Guanidines
. . . . Guanethidine
. . . . Guanidine nitrates
. . . Phenylenediamines
. . Hexamethylenetetramine
. Primary amines
. . Anilines
. . . Oxophenarsine
. . . Sulfanilamide
. . . Sulfanilic acid
. . . Toluidines
. . Cycloserine
. . Dopamine
. . Ethanolamine
. . Ethylamine
. . Ethylenediamine
. . Methylamine
. . Norepinephrine
. . Phenylenediamines
. Pyrrolidines
. . Physostigmine
. . Poldine
. Quinacrine
. Secondary amines
. . Diethylamine
. . Dimethylamine
. . Diphenylamine
. . Epinephrine
. . Mephentermine
. Tertiary amines
. . Aminopyrine
. . Amodiaquine
. . Chlorisondamine
. . Diethylpropion
. . Methylene blue
. . Trimethobenzamide
. . Tropanes
. . . Atropine
. . . Cocaine
. . . Hyoscyamine
. . . Scopolamine
. Triethylenemelamine
. Unsymmetrical dimethylhydrazine

Ammonium compounds
. Aluminum ammonium sulfate
. Ammonium halides
. Ammonium hydroxide
. Ammonium nitrate
. Ammonium perchlorate
. Ammonium sulfate
. Quaternary ammonium salts
. . Tetramethyl ammonium salts

Amphibious operations
. Amphibious demonstrations
. . Diversionary landings
. Amphibious raids
. Amphibious withdrawals

Analysis (mathematics)
. Complex variables
. . Analytic continuation
. . Analytic functions
. . . Entire functions
. . Cauchy integral formula
. . Conformal mapping
. . Meromorphic functions
. . . Elliptic functions
. . . Rational functions
. . . Zeta function
. . Riemann surfaces
. . Special functions
. . . Airy function
. . . Bessel functions
. . . . Hankel functions
. . . Beta function
. . . Exponential functions
. . . Gamma function
. . . Harmonic functions
. . . Hyperbolic functions
. . . Hypergeometric functions
. . . Laguerre functions
. . . Legendre functions
. . . Logarithm functions
. . . Mathieu functions
. . . Orthogonal functions
. . . Spherical harmonics
. Functional analysis
. . Banach space
. . . Banach algebras
. . . Hilbert space
. . Functionals
. . Generating functions
. . Harmonic analysis
. . . Almost periodic functions
. . Integral equations
. . . Fredholm equations
. . . Singular integral equations
. . . Volterra equations
. . . Wiener-Hopf equations
. . Integral transformations
. . . Bessel transformation
. . . Convolution integrals
. . . Fourier transformation
. . . Hankel transformation
. . . Laplace transformation
. Real variables
. . Calculus
. . . Bounded functions
. . . Continuity (mathematics)
. . . Differential calculus
. . . . Infliction points (mathematics)
. . . Integral calculus
. . . . Convergent integrals
. . . . Divergent integrals
. . . Limits (mathematics)
. . . Monotone functions
. . . Sequences (mathematics)
. . . Series (mathematics)
. . . . Convergent series
. . . . Dirichlet series
. . . . Divergent series
. . . . . Asymptotic series
. . . . Expansions (mathematics)
. . . . Fourier series
. . . . Power series
. . . . . Taylors series
. . . . . Maclaurin series
. . . Vector analysis
. . . . Curl (vectors)
. . . . Parametric equations
. . Calculus of variations
. . Differential equations
. . . Greens function
. . . Linear differential equations
. . . Nonlinear differential equations
. . . . Duffings differential equation
. . . . Lyapunov functions
. . . . Van der Pol differential equation
. . . Ordinary differential equations
. . . . Duffings differential equation
. . . . Sturm-Liouville theory
. . . . Van der Pol differential equation
. . . Partial differential equations
. . . . Boundary value problems
. . . . . Cauchy problem
. . . . . Dirichlet problem
. . . . . Potential theory
. . . . Elliptic differential equations
. . . . Hyperbolic differential equations
. . . . Parabolic differential equations
. . Fourier analysis
. . . Fourier integrals
. . . Fourier series
. . . Periodic functions
. . Generalized functions
. . . Delta function
. . Measure and integration
. . . Discontinuity (mathematics)
. . . Ergodic theory
. . . Integral calculus
. . . . Convergent integrals
. . . . Divergent integrals
. . . Weighting functions

Analyzers
. Electric analyzers
. . Frequency analyzers
. . . Harmonic analyzers
. . Interference analyzers
. . Network analyzers
. . Noise analyzers
. . Pulse analyzers
. . . Pulse height analyzers
. . Wave analyzers
. Electrostatic analyzers
. . Ion traps (instrumentation)
. Sound analyzers
. Spectrum analyzers

Anhydrides
. Carboxylic acid anhydrides
. . Acetic anhydride
. . Benzoic anhydride

Antennas
. Aircraft antennas
. Beacon antennas
. Broadband antennas
. . Biconical antennas
. . . Discone antennas
. . Conical antennas
. . Cylindrical antennas
. . Log periodic antennas
. . Rhombic antennas
. . Spiral antennas
. . Traveling wave antennas
. Cassegrain antennas
. Circular antennas
. Coupled antennas
. Dipole antennas
. . Cylindrical antennas
. . Sleeve antennas
. Directional antennas
. . Adcock antennas
. . Backfire antennas
. . Corner reflector antennas
. . Helical antennas
. . Horn antennas
. . Lens antennas
. . . Luneberg lenses
. . Log periodic antennas
. . Loop antennas
. . Parabolic antennas
. . . Nutating antennas
. . Radar antennas
. . . Nutating antennas
. . Rhombic antennas
. . Slot antennas
. . Steerable antennas
. . Synthetic aperture antennas
. . Traveling wave antennas
. . Yagi antennas
. Ground vehicle antennas
. Leaky wave antennas
. Long wire antennas
. Microwave antennas
. . Horn antennas
. . Lens antennas
. . . Luneberg lenses
. . Slot antennas
. Missile antennas
. Multiple beam antennas
. Navigational antennas
. . Direction finding antennas
. . . Wullenweber antennas

ABNORMALITIES
  MAGNETIC ANOMALIES
    GEOMAGNETIC HOLLOW

ACCUMULATORS
  DUST COLLECTORS
  SOLAR COLLECTORS
    SOLAR REFLECTORS

ACIDS
  AMINO ACIDS
    ADENINES
    ALANINE
    ASPARTIC ACID
    COENZYMES
    CYSTEINE
    FOLIC ACID
    GLUTAMIC ACID
    GLUTAMINE
    GLUTATHIONE
    GLYCINE
    HIPPURIC ACID
    HISTIDINE
    LEUCINE
    LYSINE
    MELANOIDIN
    METHIONINE
    NUCLEASE
    PAPAIN
    PEPTIDES
      HYPERTENSIN
    PHENYLALANINE
    PROTOPROTEINS
    PYRIDINE NUCLEOTIDES
    THYROXINE
    TRYPTOPHAN
    URIDYLIC ACID
  AMOBARBITAL
  ASCORBIC ACID
  BORIC ACIDS
  BUTYRIC ACID
  CARBONIC ACID
  CARBOXYLIC ACIDS
    ACETIC ACID
      ETHYLENEDIAMINETETRAACETIC ACIDS
        VERSENE
      IODOACETIC ACID
    ACETYLSALICYLIC ACID
    ACRYLIC ACID
    ALANINE
    ASPARTIC ACID
    BENZILIC ACID
    BENZOIC ACID
    CITRIC ACID
    DICARBOXYLIC ACIDS
      TEREPHTHALATE
    FOLIC ACID
    FORMHYDROXAMIC ACID
    FORMIC ACID
    HEXOGENES (TRADEMARK)
    LACTIC ACID
    LYSINE
    NICOTINIC ACID
    OLEIC ACID
    OXALIC ACID
    OXAMIC ACIDS
    PROPIONIC ACID
    SEBACIC ACID
    TRYPTOPHAN
    VALERIC ACID
  CHROMIC ACID
  CYANURIC ACID
  CYTIDYLIC ACID
  DEOXYRIBONUCLEIC ACID
  FATTY ACIDS
    IODOACETIC ACID
    LIPOIC ACID
    OLEIC ACID
    PROPIONIC ACID
    SEBACIC ACID
    VALERIC ACID
    VERSENE
  HYDRAZOIC ACID
  HYDROCHLORIC ACID
  HYDROFLUORIC ACID
  NITRIC ACID
  NUCLEIC ACIDS

Fig. 9a

ACIDS
(CON'T)

RIBONUCLEIC ACIDS
ADENINES
URIDYLIC ACID
OXIDASE
PERCHLORIC ACID
PHOSPHORIC ACID
SULFURIC ACID
THYMIDINE
THYMINE
URIC ACID

ACOUSTIC PROPERTIES
ACOUSTIC IMPEDANCE
ACOUSTIC INSTABILITY
ACOUSTIC SCATTERING
REVERBERATION
ACOUSTIC VELOCITY
SOUND INTENSITY
ZERO SOUND

ACTINIDE SERIES COMPOUNDS
PLUTONIUM COMPOUNDS
PLUTONIUM FLUORIDES
PLUTONIUM OXIDES
THORIUM COMPOUNDS
THORIUM FLUORIDES
THORIUM OXIDES
URANIUM COMPOUNDS
URANIUM CARBIDES
URANIUM FLUORIDES
URANIUM OXIDES

ACUITY
VISUAL ACUITY
HYPEROPIA

ADAPTATION
ACCLIMATIZATION
ALTITUDE ACCLIMATIZATION
COLD ACCLIMATIZATION
DESERT ADAPTATION
RETINAL ADAPTATION
DARK ADAPTATION
LIGHT ADAPTATION

ADDITIVES
ADMIXTURES
ANTIFREEZES
ANTIICING ADDITIVES
ANTIKNOCK ADDITIVES
ANTIOXIDANTS
OIL ADDITIVES
OPACIFIERS
PLASTICIZERS
PROPELLANT ADDITIVES
PROPELLANT BINDERS
SOLID ROCKET BINDERS

AERODYNAMIC CHARACTERISTICS
AERODYNAMIC BALANCE
AERODYNAMIC DRAG
SUPERSONIC DRAG
AERODYNAMIC STABILITY
LIFT
INTERFERENCE LIFT
JET LIFT
ROTOR LIFT
ZERO LIFT
STATIC AERODYNAMIC CHARACTERISTICS

AERODYNAMIC FORCES
AERODYNAMIC DRAG
SUPERSONIC DRAG
AERODYNAMIC LOADS
BLAST LOADS
GUST LOADS
WING LOADING
HYPERSONIC FORCES
LIFT
INTERFERENCE LIFT
JET LIFT
ROTOR LIFT

EJC-DOD Thesaurus -33- Fig 10

Intestinal (Con.)
Intestinal obstructions
Intestine
Small intestine diseases
Intestines
Adhesions (intestines)
Appendix (intestines)
Colon (intestines)
Intoxication
•Compressed air intoxication
Water intoxication
Intracellular
Intracellular potential
Intracranial
Intracranial electroencephalography
Intramuscular
•Intramuscular infusions
Intrastate
Intrastate transportation
Intravenous
•Intravenous infusions
Intrinsic
Intrinsic viscosity
Intrusion
•Igneous intrusion
Salt water intrusion
•Sea water intrusion
Intrusive
Intrusive rocks
Intussusception
Inulin
Invar®
Invariance
Inventions
Inventories
Authorized inventories
Required inventories
•Stores (inventories)
Inventory
Inventory control
Inventory models
Inverse
•Inverse matrices
•Inverse segregation
Inversions
•Heat inversions
•Inversions (temperature)
Temperature inversions
Invertebrate
Invertebrate paleontology
Invertebrates
Inverted
•Inverted siphons
Inverter
Inverter circuits
Inverters
•DC to AC inverters
Static inverters
Investigations
Accident investigations
Criminal investigations
•Field investigations
•Foundation investigations
Geologic investigations
•Seismic investigations
•Soil investigations
Subsurface investigations
Investment
•Capital investment
Fixed investment
Investment casting
Investment castings
•Permanent investment
Return on investment
Investments
Investors
•Investors method
Inviscid
Inviscid flow
Involute
Involute gear teeth
Iodates
Iodide
Hydrogen iodide
Silver iodide
Iodides
Potassium iodides
Sodium iodides
Iodination
Iodine
Iodine 131
Iodine aliphatic compounds
Iodine aromatic compounds
Iodine cycle
Iodine halides
Iodine inorganic compounds
Iodine isotopes
Iodine number
Iodine organic compounds
Iodo
•Iodo compounds
Iodoalkanes
Iodoform
Iodohydrocarbons
Iodometallates
Potassium iodometallates
Ion
•Exchangers (ion)
•Hydrogen ion activity
•Hydrogen ion concentration
Ion accelerators
Ion beams
•Ion bombardment
•Ion chambers
•Ion concentration (density)
Ion currents
Ion density (concentration)
Ion emission
Ion engines
Ion exchange membrane electrolytes
Ion exchange resins
Ion exchangers
Ion exchanging
Ion excretion
Ion guns
Ion irradiation
Ion microscopes
Ion propulsion
Ion pumps
Ion sources
•Ion thrustors
Ion traps (instrumentation)
•Ion vacuum gages
Ionic
•Ionic conductivity
Ionic crystals
Ionic mobility
Ionic regulation (physiology)
Ionization
Gas ionization
Ionization chambers
Ionization coefficients
•Ionization counters
Ionization gages
Ionization potentials
•Meteoric ionization
Ionized
•Diazo compounds (ionized)
Ionized gases
Ionizing
Ionizing radiation
Ionograms
Ionosondes
Ionosphere
Topside ionosphere
Ionospheric
•Ionospheric absorption
Ionospheric disturbances
•Ionospheric probes
Ionospheric propagation
Ionospheric storms
Sudden ionospheric disturbances
Ionospherics
Ions
Carbonium ions
Complex ions
•Hydrogen ions
•Negative ions
Organic ions
•Positive ions
IPL
IPL (programming language)
Iproniazid
IR
•IR drop
Iranian
•Iranian languages
•***Irasers***
•***IRBM***
•***Irdomes***
Iridium
Iridium alloys
Iridium containing alloys
Iridium halides
Iridium inorganic compounds
Iridium intermetallics
Iridium isotopes
Iridium organic compounds
Iridocyclitis
Iris
Iris (anatomy)
Irises
Irises (mechanical apertures)
Iritis
Iron
•Alloy cast iron
Alpha iron
Aluminum iron hardeners
Angle iron
Cast iron
Channel iron
Delta iron
•Ductile iron
Ductile iron castings
Gamma iron
Gray iron
Gray iron castings
Iron alloys
Iron and steel industry
Iron carbides
Iron castings
Iron chlorides
Iron containing alloys
Iron cyanides
Iron deficiency anemia
•Iron foundries
Iron halides
Iron inorganic compounds
Iron intermetallics
Iron isotopes
Iron nitrates
Iron ore deposits
Iron ores
Iron organic compounds
Iron oxides
Iron powder
Iron rich Permalloy®
Iron sulfate
Iron sulfides
•Malleable cast iron
Malleable iron
Malleable iron castings
Mottled iron
Nodular iron
Pig iron
•Spheroidal iron
Sponge iron
•Tramp iron
Uranium iron alloys
White iron
White iron castings
Wrought iron
Yttrium iron garnets
Irons
Electric irons
Soldering irons
•Waffle irons
Irradiance
•Irradiance meters
Irradiated
Irradiated foods
Irradiation
Alpha irradiation
•Bombardment (irradiation)
Deuteron irradiation
Electron irradiation
Food irradiation
Gamma irradiation
Ion irradiation
Neutron irradiation
Partial body irradiation
Proton irradiation
Whole body irradiation
X ray irradiation
•***Irregularities***
•***Irrelevance***
Irreversible
Irreversible processes
Irrigated
Irrigated land
Irrigation
Irrigation canals
Irrigation pipes
Sprinkler irrigation
Subsurface irrigation
Surface irrigation
Ischemia
Ischium
Isentropic
•Isentropic flow
Islands
Ice islands
Islands (landforms)
•Traffic islands
Isoamyl
•Isoamyl acetate
Isobars
Isobars (pressure)
Nuclear isobars
•***Isobutane***
•***Isobutylene***
Isocyanate
•Isocyanate resins
Isocyanates
Isocyanic
Isocyanic acid
•***Isocyanides***
Isoindoles
Isoindolines
Isolation
Isolators
•Shock isolators
Vibration isolators
Isoleucine
Isomerases
Isomeric
Isomeric transitions
Isomerism
Molecular isomerism
Isomerization
Isomers
•Isomers (nuclear)
Nuclear isomers
Isomorphisms
Isoniazid
Isonicotinamides
Isonitriles
•***Isopentane***
Isophthalic
•Isophthalic acid
•***Isopleths***
Isoprene
Isopropoxide
•Aluminum isopropoxide
Isopropyl
•Isopropyl benzene
Isoptera
Isoquinolines
Isospin
Isostasy
Isostatic
•Isostatic change
Isostatic pressing
Isothermal
Isothermal annealing
•Isothermal transformation
Isothermal treatment
Isotherms
Isothiocyanates
•***Isothionicotinamides***
Isothiuronium
Isothiuronium compounds
Isotope
•Cascades (isotope separation)
Chemical exchange isotope separation
Electromagnetic isotope separation
Isotope availability
Isotope effect
Isotope exchange
Isotope impurities
Isotope separation
•Isotope shift
Isotopes
Actinium isotopes
Aluminum isotopes
Americium isotopes
Antimony isotopes
Argon isotopes
Arsenic isotopes
Astatine isotopes
Barium isotopes
Berkelium isotopes
Beryllium isotopes
Bismuth isotopes
Boron isotopes
Bromine isotopes
Cadmium isotopes
Calcium isotopes
Californium isotopes
Carbon isotopes
Cerium isotopes
Cesium isotopes
Chlorine isotopes
Chromium isotopes
Cobalt isotopes
Copper isotopes
Curium isotopes
Dysprosium isotopes
Einsteinium isotopes
Erbium isotopes
Europium isotopes
Fermium isotopes
Fluorine isotopes
Francium isotopes
Gadolinium isotopes
Gallium isotopes
Germanium isotopes
Gold isotopes
Hafnium isotopes
Helium isotopes
Holmium isotopes
Hydrogen isotopes
Indium isotopes
Iodine isotopes

Fig. 11

ACOUSTIC

NASA THESAURUS (PERMUTED INDEX)

ACOUSTIC
  ACOUSTIC ATTENUATION
ACOUSTIC
  ACOUSTIC DELAY LINES
  ACOUSTIC DUCTS
  ACOUSTIC EXCITATION
  ACOUSTIC FATIGUE
  ACOUSTIC IMPEDANCE
  ACOUSTIC INSTABILITY
  ACOUSTIC MEASUREMENTS
  ACOUSTIC NOZZLES
  ACOUSTIC PROPAGATION
  ACOUSTIC PROPERTIES
  ACOUSTIC SCATTERING
  ACOUSTIC SIMULATION
  ACOUSTIC STREAMING
  ACOUSTIC VELOCITY
  COHERENT ACOUSTIC RADIATION
ACOUSTICS
  UNDERWATER ACOUSTICS
ACQUISITION
  DATA ACQUISITION
  TARGET ACQUISITION
ACRYLIC
  ACRYLIC ACID
  ACRYLIC RESINS
ACTH
  ADRENOCORTICOTROPIN (ACTH)
ACTINIDE
  ACTINIDE SERIES
  ACTINIDE SERIES COMPOUNDS
ACTION
  NONOSCILLATORY ACTION
ACTIONS
  EVASIVE ACTIONS
  INVOLUNTARY ACTIONS
ACTIVATION
  ACTIVATION (BIOLOGY)
  ACTIVATION ENERGY
  NEUTRON ACTIVATION ANALYSIS
ACTIVE
  ACTIVE SATELLITES
ACTIVITY
  ACTIVITY (BIOLOGY)
  ACTIVITY CYCLES (BIOLOGY)
  CATALYTIC ACTIVITY
  ENZYME ACTIVITY
  EXTRAVEHICULAR ACTIVITY
  SOLAR ACTIVITY
  SOLAR ACTIVITY EFFECTS
ACTUATED
  PROPELLANT ACTUATED DEVICES
  PROPELLANT ACTUATED INSTRUMENTS
ACTUATOR
  ACTUATOR DISKS
ACUITY
  VISUAL ACUITY
ADAPTATION
  DARK ADAPTATION
  DESERT ADAPTATION
  LIGHT ADAPTATION
  RETINAL ADAPTATION
ADAPTIVE
  ADAPTIVE CONTROL
  ADAPTIVE FILTERS
  SELF ADAPTIVE CONTROL SYSTEMS
ADDING
  ADDING CIRCUITS
ADDISONS
  ADDISONS DISEASE
ADDITION
  ADDITION RESINS
  ADDITION THEOREM
ADDITIVES
  ANTIICING ADDITIVES
  ANTIKNOCK ADDITIVES
  OIL ADDITIVES
  PROPELLANT ADDITIVES
ADDRESS
  PUBLIC ADDRESS SYSTEMS
ADENOSINE
  ADENOSINE DIPHOSPHATE (ADP)
  ADENOSINE TRIPHOSPHATE (ATP)
ADEPT
  HONEYWELL ADEPT COMPUTER
ADHESION
  ADHESION TESTS
ADIABATIC
  ADIABATIC CONDITIONS
  ADIABATIC EQUATIONS
  ADIABATIC FLOW
ADIPOSE
  ADIPOSE TISSUES
ADIPRENE
  ADIPRENE (TRADEMARK)
ADP
  ADENOSINE DIPHOSPHATE (ADP)
ADRENAL
  ADRENAL GLAND
  ADRENAL METABOLISM
ADRENOCORTICOTROPIN
  ADRENOCORTICOTROPIN (ACTH)
ADSORPTION
  GIBBS ADSORPTION EQUATION
ADVANCED
  ADVANCED RANGE INSTRUMENTATION SHIP
  ADVANCED SODIUM COOLED REACTOR
  ADVANCED TEST REACTORS
  ADVANCED VIDICON CAMERA SYSTEM (AVCS)
ADVENT
  ADVENT PROJECT
AEOLIAN
  AEOLIAN TONES
AERIAL
  AERIAL EXPLOSIONS
  AERIAL PHOTOGRAPHY
  AERIAL RECONNAISSANCE
  AERIAL RUDDERS
AEROBEE
  AEROBEE ROCKET VEHICLE
AERODYNAMIC
  AERODYNAMIC BALANCE
  AERODYNAMIC BRAKES
  AERODYNAMIC CHARACTERISTICS
  AERODYNAMIC COEFFICIENTS
  AERODYNAMIC CONFIGURATIONS
  AERODYNAMIC DRAG
  AERODYNAMIC FORCES
  AERODYNAMIC HEAT TRANSFER
  AERODYNAMIC HEATING
  AERODYNAMIC LOADS
  AERODYNAMIC NOISE
  AERODYNAMIC STABILITY
  AERODYNAMIC STALLING
  SPIKES (AERODYNAMIC CONFIGURATIONS)
  STATIC AERODYNAMIC CHARACTERISTICS
AERODYNAMICS
  ROTOR AERODYNAMICS
AERONAUTICAL
  AERONAUTICAL ENGINEERING
AEROS
  AEROS SATELLITE
AEROSPACE
  AEROSPACE ENGINEERING
  AEROSPACE ENVIRONMENTS
  AEROSPACE INDUSTRY
  AEROSPACE MEDICINE
  AEROSPACE SCIENCES
  AEROSPACE SYSTEMS
  AEROSPACE VEHICLES
AFFERENT
  AFFERENT NERVOUS SYSTEMS
AFTEREFFECTS
  MOTION AFTEREFFECTS
AFTERGLOW
  HELIUM AFTERGLOW
  OXYGEN AFTERGLOW
AGE
  AGE FACTOR
  RADIOACTIVE AGE DETERMINATION
AGENA
  AGENA A ROCKET VEHICLE
  AGENA B RANGER PROGRAM
  AGENA B ROCKET VEHICLE
  AGENA C ROCKET VEHICLE
  AGENA D ROCKET VEHICLE
  AGENA ROCKET VEHICLES
  ATLAS AGENA B LAUNCH VEHICLE
  ATLAS AGENA LAUNCH VEHICLES
  THOR AGENA LAUNCH VEHICLE
AGENTS
  ACCELERATING AGENTS
  ANTIHYPERTENSIVE AGENTS
  STABILIZERS (AGENTS)
AGING
  AGING (BIOLOGY)
  AGING (METALLURGY)

EJC-DOD Thesaurus -35- Fig. 12

0903 (Con.)
- Synchronous motors
- Voltage gain
- Voltage regulation
- Wiring
- Wiring diagrams
- Wound-rotor induction motors

0904
Information Theory
- Coders
- Coding theory
- Communication theory
- Data transmission
- Decoders
- Error correction codes
- Error detection codes
- Hollerith code
- Information capacity
- Information theory
- Intelligibility
- Symbols

0905
Subsystems
- Acoustic arrays
- Acoustic delay lines
- AC to DC converters
- Adcock antennas
- Aircraft antennas
- Amplifiers
- Antenna amplifiers
- Antenna arrays
- Antenna couplers
- Antenna feeds
- Antennas
- Antenna scanners
- Audio amplifiers
- Autotransformers
- Backfire antennas
- Bandpass amplifiers
- Beacon antennas
- Biconical antennas
- Broadband amplifiers
- Broadband antennas
- Cascade control
- Cassegrain antennas
- Circuits
- Circular antennas
- Class A amplifiers
- Class B amplifiers
- Class C amplifiers
- Conical antennas
- Constant current transformers
- Copper oxide rectifiers
- Corner reflector antennas
- Counterpoises
- Coupled antennas
- Crystal video receivers
- Current amplifiers
- Current regulators
- Current transformers
- Cylindrical antennas
- DC to DC converters
- Demodulators
- Dielectric amplifiers
- Differential amplifiers
- Diplexers
- Dipole antennas
- Direct coupled amplifiers
- Directional antennas
- Direction finding antennas
- Discone antennas
- Distributed amplifiers
- Dry disk rectifiers
- Earphones
- Echo repeaters
- Electric controllers
- Electric converters
- Electroluminescent panels
- Electronic display systems
- Electron tube amplifiers
- Endfire arrays
- Feedback amplifiers
- Ferrimagnetic amplifiers
- Fluorescent screens
- Frequency converters
- Frequency dividers
- Frequency multipliers
- Frequency synthesizers
- Full wave rectifiers
- Ground vehicle antennas
- Half wave rectifiers
- Hall generators
- Helical antennas
- Horn antennas
- Infrared parametric amplifiers
- Input impedance
- Integrators
- Intermediate frequency amplifiers
- Laser amplifiers
- Latching relays
- Leaky wave antennas
- Lens antennas
- Logarithmic amplifiers
- Log periodic antennas
- Long wire antennas
- Loop antennas
- Low noise amplifiers
- Low noise preamplifiers
- Luneberg lenses
- Magnetic modulators
- Mercury arc rectifiers
- Microphones
- Microwave amplifiers
- Microwave antennas
- Microwave receivers
- Missile antennas
- Modems
- Modulators
- Monopole antennas
- Multiple beam antennas
- Navigational antennas
- Noise generators
- Nutating antennas
- Omnidirectional antennas
- Operational amplifiers
- Parabolic antennas
- Parametric amplifiers
- Phased arrays
- Piezoelectric transducers
- Polarized relays
- Potential transformers
- Power amplifiers
- Power distribution lines
- Power lines
- Power subtransmission lines
- Power transformers
- Power transmission lines
- Power transmission towers
- Preamplifiers
- Pulse amplifiers
- Pulse generators
- Pulse integrators
- Pulse transformers
- Pulse transmitters
- Push pull amplifiers
- Radiofrequency amplifiers
- Radiofrequency generators
- Radiofrequency power
- Ramp response
- Rectifiers
- Rhombic antennas
- Rocket antennas
- Selenium rectifiers
- Sense antennas
- Servoamplifiers
- Servomotors
- Ship antennas
- Signal generators
- Sleeve antennas
- Slot antennas
- Spacecraft antennas
- Spherical antennas
- Spiral antennas
- Standing wave indicators
- Steerable antennas
- Strip transmission lines
- Submarine antennas
- Surface wave antennas
- Sweep generators
- Switchboards
- Synchro control transformers
- Synchro differential generators
- Synchro differential motors
- Synthetic aperture antennas
- Tank circuits
- T antennas
- Television antennas
- Time delay relays
- Timing circuits
- Transformers
- Transistor amplifiers
- Transmission lines
- Traveling wave antennas
- Tuned amplifiers
- Tuners
- Turnstile antennas
- Underground antennas
- Unfurlable antennas
- Video amplifiers
- Voltage amplifiers
- Voltage dividers
- Voltage regulators
- Waveform generators
- Waveguides
- Wullenweber antennas
- Yagi antennas

0906
Telemetry
- Biotelemetry
- Decommutators
- Electrical telemetry
- Mechanical telemetry
- Radio telemetry
- Telemetering antennas
- Telemetering data
- Telemetering equipment
- Telemetering receivers
- Telemetering transmitters
- Telemetry

1000 Nonpropulsive Energy Conversion

1001
Conversion Techniques
- Diesel electric power generation
- Direct electric power generation
- Direct energy conversion
- Electric power generation
- Electrochemical power generation
- Gas turbine power generation
- Hydroelectric power generation
- Magnetite
- Mobile power generation
- Nuclear electric power generation
- Precise power generation
- Solar power generation
- Steam electric power generation
- Thermionic power generation
- Thermoelectric energy conversion
- Thermoelectric power generation
- Thermonuclear power generation
- Tidal power generation
- Uninterruptible power generation
- Wind power generation

1002
Power Sources
- AC generators
- Amplidynes
- Auxiliary electric power units
- Auxiliary power plants
- Bacon fuel cells
- Biochemical fuel cells
- Cascaded elements
- Cesium thermionic converters
- Closed cycle EHD generators
- Closed cycle MHD generators
- DC generators
- Direct power generators
- Dynamotors
- Electric generators
- Electric power plants
- Electric reactors
- Electrohydrodynamic generators
- Electrohydrodynamic power generation
- Electrostatic generators
- Energy conversion heat sources
- Fossil fuel thermionic converters
- Fuel cell catalysts
- Fuel cell electrodes
- Fuel cell electrolytes
- Fuel cell fuels
- Fuel cell oxidants
- Fuel cells
- Fuel cell separators
- Fuel conditioning (fuel cells)
- Hand generators
- Hydroelectric generators
- Inverters
- Ion exchange membrane electrolytes
- Liquid metal fuel cells
- Liquid metal MHD generators
- Magnetoelectric generators
- Magnetohydrodynamic generation
- Magnetohydrodynamic generators
- Magnetos
- Motor generators
- Motors
- Nuclear auxiliary power units
- Nuclear power plants
- Nuclear thermionic converters
- Open cycle EHD generators
- Open cycle MHD generators
- Plasma closed cycle MHD generators
- Portable thermionic converters
- Portable thermoelectric generators
- Pulsed power MHD generators
- Radiation resistant solar cells
- Radioisotope thermoelectric devices
- Regenerative fuel cells
- Regenerators
- Rotating generators
- Saturable reactors
- Segmented elements
- Solar cells
- Solar energy concentrators
- Solar generators
- Solar reflectors
- Spacecraft electric power units
- Standby power generation
- Standby power generators
- Static inverters
- Thermal power plants
- Thermionic collectors
- Thermionic converters
- Thermionic heat pipes
- Thermoelectric generators
- Thermophotovoltaic converters
- Tidal power plants
- Turbogenerators
- Van de Graaff generators
- Windmills

1003
Energy Storage
- Alkaline batteries
- Battery chargers
- Battery depolarizers
- Battery electrodes
- Battery electrolytes
- Battery separators
- Battery testers
- Dry cells
- Electric batteries
- Electrochemical cells
- Energy storage
- High rate batteries
- Lead acid batteries
- Low temperature batteries
- Metal air batteries
- Missile batteries
- Nickel cadmium batteries
- Primary batteries
- Radioisotope batteries
- Reserve batteries
- Sea water batteries
- Storage batteries
- Thermal batteries
- Torpedo batteries
- Water activated batteries
- Wet cells

1100 Materials

1101
Adhesives and Seals
- Adhesive papers
- Adhesives
- Adhesive tapes
- Dopes
- Fuel seals
- Gaskets
- Gas seals
- Glass seals
- Glass to metal seals
- Glue
- Heat sealing
- Hermetic seals
- Hydraulic seals
- Joint fillers
- Joint sealers
- Labyrinth seals
- Metallic seals
- Oil seals
- O ring seals
- Packing materials
- Packings (seals)
- Plastic seals
- Plugs
- Pressure sensitive adhesives

Fig. B

0101 Aerodynamic characteristics, (cont)

THERMAL DIFFUSIVITY
THICKNESS RATIO
THIN AIRFOILS
THIN BODIES
THIN PLATES
THIN WALLED SHELLS
THIN WALLS
THREE DIMENSIONAL BOUNDARY LAYER
THRUST
THRUST AUGMENTATION
THRUST-WEIGHT RATIO
TILTED PROPELLERS
TIP SPEED
TOLLMEIN-SCHLICHTING WAVES
TORSIONAL VIBRATION
TRAILING EDGES
TRAILING-EDGE FLAPS
TRANSIENT LOADS
TRANSITION LAYERS
TRANSITION POINTS
TRANSONIC FLIGHT
TRANSONIC FLOW
TRANSONIC FLUTTER
TRANSONIC SPEED
TRAPEZOIDAL TAIL SURFACES
TUMBLING MOTION
TURBIDITY
TURBULENCE
TURBULENCE EFFECTS
TURBULENCE METERS
TURBULENT BOUNDARY LAYER
TURBULENT FLOW
TURBULENT WAKES
UNCAMBERED WINGS
UNDAMPED OSCILLATIONS
UNIFORM FLOW
UNLOADING
UNSTEADY FLOW
UPWASH
VARIABLE SWEEP WINGS
VARIABLE THRUST
VELOCITY
VELOCITY DISTRIBUTION
VELOCITY ERRORS
VELOCITY MEASUREMENT
VENTS
VIBRATION
VIBRATION EFFECTS
VIBRATIONAL STRESS
VIBRATORY LOADS
VISCOELASTIC CYLINDERS
VISCOUS DRAG
VON KARMAN EQUATION
VORTEX BREAKDOWN
VORTEX RINGS
VORTICES
WAKES
WAVE DRAG
WAVES
WEDGE FLOW
WEDGES
WEIGHT (MASS)
WIND (METEOROLOGY)
WIND EFFECTS
WIND TUNNEL STABILITY TESTS
WINDS ALOFT
WING CAMBER
WING FLOW METHOD TESTS
WING LOADING
WING OSCILLATIONS
WING PROFILES
WING SPAN
WING-FUSELAGE STORES
WOODEN STRUCTURES
YAW
YAWING MOMENTS
ZERO ANGLE OF ATTACK
ZERO LIFT

0102 AERODYNAMICS OF BODIES
ABLATIVE MATERIALS
ABLATIVE NOSE CONES
AERODYNAMIC BALANCE
AERODYNAMIC CHARACTERISTICS
AERODYNAMIC DRAG
AERODYNAMIC LOADS
AIRCRAFT CONFIGURATIONS
AIRCRAFT STRUCTURES
AIRFOIL FENCES
AIRFOIL PROFILES
AIRFOILS
AIRFRAMES
ASPECT RATIO
AXES OF ROTATION
AXISYMMETRIC BODIES
AXISYMMETRIC FLOW
BALLAST
BLUFF BODIES
BLUNT BODIES
BOATTAILS
BODIES OF REVOLUTION
BODY-WING AND TAIL CONFIGURATIONS
BOUNDARY LAYER CONTROL
BOWS
BULKHEADS
CAMBER
CASCADES
CORE FLOW
CURRENTS
CYLINDRICAL BODIES
DEFLECTORS
DESIGN
DUCTED BODIES
ENCKE METHOD
FAIRINGS
FAN IN WING AIRCRAFT
FEED SYSTEMS
FENCES
FILLETS
FINNED BODIES
FINS
FLAPS (CONTROL SURFACES)
FLARED BODIES
FLEXIBLE BODIES
FOLDING STRUCTURES
FOREBODIES
FRICTION DRAG
FRICTIONLESS ENVIRONMENTS
FROZEN EQUILIBRIUM FLOW
FULL SCALE TESTS
FUSELAGES
GLIDE LANDINGS
GLIDE PATHS
GLIDERS
GUST ALLEVIATORS
GUST LOADS
HALF CONES
HALPHEN METHOD
HAMMERHEAD CONFIGURATION
HIGH ASPECT RATIO
HULLS (STRUCTURES)
HYPERVELOCITY FLOW
INFINITE SPAN WINGS
JOUKOWSKI TRANSFORMATION
LAMINAR FLOW AIRFOILS
LEADING EDGE SLATS
LEADING EDGE SWEEP
LEADING EDGES
LIFT
LIFT AUGMENTATION
LIFT DEVICES
LOW ASPECT RATIO
LOW ASPECT RATIO WINGS
MASS BALANCE
MEMBRANE STRUCTURES
METAL PLATES
METAL SHELLS
MISSILE STRUCTURES
MONOCOQUE STRUCTURES
MONOPLANES
NACELLES
NEWTON-BUSEMANN LAW
NOSE CONES
NOSE INLETS
OGIVES
PARAWINGS
PLASTIC AIRCRAFT STRUCTURES
POHLHAUSEN METHOD
PORTS
PRESSURE DISTRIBUTION
PRESSURE REDUCTION
PROPELLER SLIPSTREAMS
PROTUBERANCES
PYRAMIDAL BODIES
RAMPS
RIDGES
RIGID MOUNTING
RIGID WINGS

"PERMISSION TO REPRODUCE THIS COPYRIGHTED MATERIAL HAS BEEN GRANTED BY

Herbert R. Koller

TO ERIC AND ORGANIZATIONS OPERATING UNDER AGREEMENTS WITH THE U.S. OFFICE OF EDUCATION FURTHER REPRODUCTION OUTSIDE THE ERIC SYSTEM REQUIRES PERMISSION OF THE COPYRIGHT OWNER"

Figure 14

BK-65	BIOMEDICAL TECHNIQUES & MEASUREMENT
BK-66	ABSENTEEISM
BK-67	ATTACK RATES
BK-68	BIOCLIMATOLOGY
BK-69	EPIDEMIOLOGY
BK-70	GENETICS
BK-71	HEALTH STATISTICS
BK-72	HEMATOLOGY
BK-73	BLOOD CHEMISTRY
BK-74	BLOOD GAS ANALYSIS
BK-75	CARBOXYHEMOGLOBIN
BK-76	HEMOGLOBIN INTERACTIONS
BK-77	IMMUNOLOGY
BK-78	ANTIBODIES
BK-79	ANTIGENS
BK-80	LIFE SPAN
BK-81	MORBIDITY
BK-82	MORTALITY
BK-83	OCCUPATIONAL HEALTH
BK-84	OUTPATIENT VISITS
BK-85	PATHOLOGICAL TECHNIQUES
BK-86	RADIOLOGICAL HEALTH
BL-48	TISSUE CULTURES
BK-87	TREATMENT & AIDS
BK-88	ARTIFICIAL RESPIRATION
BK-89	BREATHING EXERCISES
BK-90	DIAGNOSIS
BK-91	AUTOPSY
BK-92	BIO-ASSAY
BK-93	BIOPSY
BK-94	SKIN TESTS
BK-95	DRUGS
BK-96	ANTIDOTES
BK-97	BRONCHODILATORS
BK-99	INHALATION THERAPY
BL-00	MEDICAL FACILITIES
BL-02	PHYSICAL THERAPY
BL-03	RADIOGRAPHY
BL-04	SURGERY
BL-05	VETERINARY MEDICINE
BK-22	URINALYSIS

BL-06	BODY CONSTITUENTS & PARTS
BL-07	BODY FLUIDS
BL-08	BONES
BL-13	CELLS
BL-14	BLOOD CELLS
GR-41	LEUKOCYTES
BL-17	LYMPHOCYTES
BL-15	CHROMOSOMES
BL-16	CILIA
BL-18	SPERMATOZOA
BL-09	CIRCULATORY SYSTEM
BL-10	BLOOD VESSELS
BL-11	HEART
BL-19	DIGESTIVE SYSTEM
BL-20	ESOPHAGUS
BL-21	INTESTINES
BL-22	LIVER
BL-23	MOUTH
BL-24	STOMACH
BL-25	ENZYMES
BL-46	EPITHELIUM
BL-26	EXCRETIONS
BL-27	EYES
BL-28	GLANDS
BL-29	HISTAMINES
BL-30	HORMONES
BL-31	KIDNEYS
BL-32	LIPIDS
BL-33	MEMBRANES
BL-34	NERVOUS SYSTEM
GY-29	NUCLEIC ACIDS
BL-35	PROTEINS
BL-36	AMINO ACIDS
BL-37	RESPIRATORY SYSTEM
BL-38	BRONCHI
BL-39	LARYNX
BL-40	LUNGS
BL-41	ALVEOLI
BL-42	NOSTRILS
BL-43	SINUSES
BL-44	TRACHEA
BL-45	SKIN
BL-46	EPITHELIUM
BL-47	TISSUES

BL-49	BODY PROCESSES & FUNCTIONS
BL-50	ADAPTATION
BL-52	BLOOD PRESSURE
BL-53	CELL GROWTH
BL-54	CELL METABOLISM
BL-55	DIGESTION
BL-56	INGESTION
BL-57	INHIBITION
BL-58	METABOLISM
BL-59	PULSE RATE
BL-60	REPRODUCTION
BL-61	RESPIRATORY FUNCTIONS
BL-62	BREATHING
BL-63	COMPLIANCE
GY-51	DEPOSITION
GY-98	LUNG CLEARANCE
BL-64	OXYGEN CONSUMPTION
BL-65	PULMONARY FUNCTION
BL-66	OXYGEN DIFFUSION
BL-67	PULMONARY RESISTANCE
BL-68	VENTILATION (PULMONARY)
BL-69	RETENTION
BL-71	SYNERGISM
BL-72	THRESHOLDS
BL-73	TOXIC TOLERANCES

BL-74	DISEASES & DISORDERS
BL-75	ALLERGIES
BL-76	ANEMIA
BL-77	ANOXIA
BL-79	ASPHYXIATION
Y-71	BERYLLIOSIS
BL-80	BLINDNESS
BL-81	CANCER
BL-82	BRONCHIAL
BL-83	LEUKEMIA
BL-84	LUNG
BL-85	SKIN
BL-86	TRACHEAL
Y-78	CARCINOGENS
BL-87	CARDIOVASCULAR DISEASES
BL-88	ERYTHEMA
BL-89	EYE IRRITATION
BL-90	FLUOROSIS
BL-91	HEADACHE
BL-92	HEALTH IMPAIRMENT
BL-93	HYPERSENSITIVITY
BL-94	HYPERVENTILATION
BL-95	HYPOXIA
BL-96	INFECTIOUS DISEASES
BL-97	LACHRYMATION
BL-98	METAL POISONING
BL-99	MUTATIONS
GR-00	NAUSEA
GR-01	ORGANIC DISEASES
GR-02	RESPIRATORY DISEASES
GR-03	ADENOVIRUS INFECTIONS
GR-04	ASTHMA
GR-05	BRONCHITIS
GR-06	BRONCHOCONSTRICTION
GR-07	BRONCHOPNEUMONIA
GR-08	COMMON COLD
GR-09	COUGH
GR-10	EMPHYSEMA
GR-11	HAYFEVER
GR-12	INFLUENZA
GR-13	LARYNGITIS
GR-14	PLEURISY
GR-15	PNEUMOCONIOSIS
P-84	ANTHRACOSIS
BL-78	ASBESTOSIS
S-72	BYSSINOSIS
S-84	FARMER'S LUNG
GR-18	SILICOSIS
GR-16	PNEUMONIA
GR-17	PULMONARY EDEMA
GR-19	TUBERCULOSIS
GR-20	STERILIZATION
GR-21	TUMORS

FIG. 1. Microthesaurus of air pollution terms; biosciences and medicine